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# REVISTA DE ENTOMOLOGIA

**Diretor: Thomaz Borgmeier, O. F. M.**

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## Experiências sobre o combate à formiga saúva, *Atta sexdens* (L. 1758) (Hymenoptera, Formicidae)

por Thomas B. Snipes, Ph. D. & Frederico Vanetti  
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(Com 1 figura e 8 tabelas)

A formiga saúva, *Atta sexdens* (L., 1758), tem constituído a peor praga da Agricultura do Brasil, desde os tempos coloniais. Apesar dos grandes avanços na técnica dos processos e métodos de combate a tão daninho inseto, bem como das acertadas medidas adotadas pelos governos federal e estaduais na difusão dos ensinamentos técnicos concernentes á sua extinção a saúva é ainda considerada como o inseto que acarreta anualmente os maiores danos ás plantas cultivadas.

Com o aumento da população e consequente expansão agrícola a área cultivada foi-se tornando proporcionalmente maior traduzindo-se num maior ataque por parte da saúva ás plantas cultivadas, devido naturalmente á substituição das plantas silvestres por campos de cultura.

Não há lavrador que não conheça este minúsculo inseto, bem como não tenha sofrido os efeitos desastrosos das atividades danosas dessa poderosa sociedade. Um saúveiro exemplifica uma das mais perfeitas sociedades. E' do conhecimento geral que quasi todas as culturas são danificadas pela saúva, havendo, naturalmente, por parte do referido inseto, uma certa predileção por determinadas plantas como sejam: algodão, citrus, encalptos, roseira, etc. Em vista disso, indispensavel se torna a eliminação dos formigueiros, afim de que sejam afastados os riscos de sérios prejuizos.

Não sómente ás plantas causam estes insetos os seus prejuizos; os seus ninhos, não muito raramente, devido á falta de conhecimentos ou descaso dos lavradores, vêm a se localizar ao lado das casas, muros e outras obras de arte que, com o correr do tempo, podem ser grandemen e danificadas por ficarem abalados os seus alicerces, devido ao constante trabalho de excavação feito pelas formigas, destinado à ampliação do formigueiro.

Não raro tambem, as casas, cujos formigueiros se acham situados nas suas proximidades, sofrem a importuna visita das

formigas, que, em filas intermináveis carregam á sua sede os grãos encontrados no interior das mesmas.

A luta contra este flagelo já foi de há muito iniciada; processos vários, mesmo os mais primitivos, têm sido empregados sem que contudo possam lograr alto grau de eficiência. E' que a potência biótica da saúva é considerável. Milhares de içás, todos os anos, saem dos formigueiros onde tiveram origem e, voando, distribuem-se pelos campos, indo formar novos formigueiros. A sua morada é feita no solo ao abrigo das intempéries e de seus inimigos. Servem-se de quasi todas as plantas para o desenvolvimento do fungo que cultivam e o qual lhes serve de alimento.

A maioria dos processos usados no combate a esta praga é boa, quando observados com rigor os seus mínimos detalhes. Da inobservancia, pois, das regras prescritas é que advêm os insucessos, tornando os fazendeiros cépticos, induzindo-os, ás vezes, a adotar as dispendiosas e primitivas operações de extinção á enxada, quando não os inclinam a abandonar aquele inseto á sua tarefa de destruição.

Nas tardes ensolaradas e quentes de novembro e dezembro, após as rápidas chuvas, os machos e fêmeas alados, aos borbotões, acorrem á superfície do formigueiro, ansiosos para dar cumprimento ás determinações impostas pela natureza. Após ensaiarem vôo, procuram ganhar altura onde, ajudados pelas correntes de ar são dispersados em todas as direcções. Durante o trajeto aéreo, verifica-se a união dos sexos. Cando ao solo, os machos, que têm por única finalidade a fecundação, vêm a morrer, caçados pelos seus inimigos naturais ou pela incapacidade de adquirir o alimento apropriado á sua manutenção. As içás, que escapam á voracidade das aves e outros animais, que lhe dão acérrimo combate, acham-se no limiar de uma nova vida, qual a ser rainha de uma colônia; para tal fim, eliminam as asas e iniciam a excavação da primeira célula, que representa o primeiro passo para a formação de um grande formigueiro á semelhança daquele onde teve origem. Para isto, a içá, nos contínuos vai e vem, perfura um canal vertical de 20 a 30 cms. de comprimento com um diâmetro suficiente para poder transitar, em cuja extremidade constróe uma câmara de 4 a 5 cms. de diâmetro. Terminado este penoso trabalho, ela obstróe a entrada do canal, afim de se pôr a salvo dos agentes que lhe são desfavoráveis.

A fundação de uma colônia, até o aparecimento das pri-

meiras obreiras, segundo J. Huber, realiza-se do seguinte modo:

A içá, havendo completado a construção da câmara, expelle no dia imediato ao do vôo de núpcias, uma pequena bola de 5 mms. de diâmetro, branca, amarela, a qual consiste em hifas de fungo, retiradas do formigueiro materno e guardadas na cavidade infra-bucal. Afim de conservar o fungo em pleno desenvolvimento ela irriga-o constantemente com suas fezes líquidas, até o aparecimento das pequeninas obreiras que tomam para si este encargo até o momento em que lhes seja possível alimentá-los com pedacinhos de folhas. A fêmea põe no terceiro dia 3 a 6 ovos, época em que o fungo já está emitindo suas hifas em todas as direções. Ela então separa a massa em duas porções, neste ou no dia seguinte. Nos próximos 10 a 12 dias ela põe diariamente 10 ovos; progressivamente as hifas vão se tornando mais numerosas e os ovos que a princípio eram colocados separadamente são então postos de permcio com o micélio do fungo; passados 8 a 10 dias, a massa de micélio mede, aproximadamente, 1 cm. de diâmetro; a fêmea então dá a esta massa o formato de um disco com uma depressão no centro, no qual, daquele momento em diante, são conservados os ovos e larvas.

O aparecimento das primeiras larvas é verificado 14 a 16 dias após o início da fundação do formigueiro; estas são então cuidadosamente tratadas pela mãe com seus próprios ovos. Um mês depois da fundação do formigueiro, surgem as primeiras pupas. Nesta ocasião, já o fungo apresenta o diâmetro de 2 cms., não havendo corpúsculos *Kohlrabi*. Após uma semana, as pupas vão se tornando escuras e com poucos dias mais dá-se o aparecimento das primeiras obreiras. Estas começam então a cuidar das larvas, alimentando-as com ovos e do jardim do fungo, que nessa ocasião já apresenta os corpúsculos *Kohlrabi* de que se alimenta no futuro toda a colônia. Assim pois, o tempo necessário para o estabelecimento de uma colônia é, nas condições mais favoráveis, de 40 dias.

As pequenas obreiras 10 dias após o seu aparecimento, ou 7 semanas depois do início do formigueiro, retiram a terra que obstruia a entrada do canal e comunicam-se com o exterior. Observa-se então, circundando a entrada do ninho, uma pequena cratera, formada pelo acúmulo da terra retirada do interior do jovem formigueiro. Elas iniciam então o



ataque às plantas afim de transportar para o ninho o material necessário para o bom desenvolvimento do fungo que cultivam em seus jardins.

Dia após dia, inúmeras obreiras vão aparecendo, aumentando a atividade do jovem formigueiro que começa a ser ampliado. Novos canais e painéis vão sendo construídos para fazer face ao aumento sempre crescente da colônia.

Num formigueiro bem desenvolvido, próximo à época da enxameagem, além das formas sexuadas — fêmeas (içás) e machos (bitús), há 3 castas principais: os «soldados», casta de indivíduos mais desenvolvidos e robustos dos neutros, possuidores de fortes mandíbulas, são os guardas de seu reduto, protegendo-o contra as investidas de seus inimigos. A segunda casta, a das «cortadeiras» que tem a função de prover o ninho com o material necessário ao bom desenvolvimento do fungo. Por último, a casta das «jardineiras» que, como o nome bem indica, tem por função receber o material trazido pelas carregadeiras, picá-lo em pedaços, retirar-lhes os elementos estranhos que por ventura existam e arrumá-lo em camadas no interior das painéis onde cresce o fungo.

Ao depararmos com um formigueiro notamos que sobre a superfície do solo há uma camada de terra fofa mais ou menos espessa, ocupando uma área muitas vezes, de dezenas de metros quadrados, resultado das excavações feitas pelas formigas na construção de canais e painéis constituindo a sede do formigueiro ou ninho. Pelas dimensões da terra solta podemos, ainda que um tanto imperfeitamente, ter uma idéia da sua idade e tamanho. Num corte transversal de um formigueiro verificamos que as primeiras painéis se encontram numa profundidade de 50 a 70 cms., de acordo com a idade do formigueiro, tipo e topografia do solo. A região situada entre a superfície do terreno e as primeiras câmaras, é atravessada por uma grande quantidade de canais que se cruzam em todas as direções, formando um verdadeiro labirinto. A disposição desses canais é de molde a proteger a colônia contra a penetração das águas das chuvas e quaisquer outros fatores desfavoráveis. As painéis, de dimensões variáveis, têm o formato hemisférico tendo a parte superior abobadada e a inferior plana; são ligadas entre si por canais, e são dispostas desordenadamente em diferentes planos. Constituem a sede propriamente dita, parte vital do formigueiro, pois é no

seu interior que cresce o fungo e se encontram as diversas fases do inseto.

Os canais representam papéis importantíssimos na constituição de um formigueiro e, de acordo com a sua localização são conhecidos como: mestres — são os que, partindo da superfície do formigueiro, atravessam a região dos inúmeros canais paralelos e finos e se dirigem para baixo mais ou menos obliquamente. Mediante canais secundários ou de ligação comunicam-se com as painéis. Os de defesa — são geralmente finos, partindo da superfície do formigueiro vão ligar-se aos canais mestres e painéis. Os de serviço — são os que, comunicando-se com os canais mestres, se estendem às vezes a muitas dezenas de metros de distância, caminhando paralelamente e muito próximo à superfície do solo. De espaço a espaço, observam-se os suspiradouros que são montículos de terra em forma de pequenas crateras resultantes do depósito da terra excavada pela formiga, na construção dos canais de serviço. Estes, geralmente terminam próximo às plantas a serem atacadas. São as vias de comunicação subterrânea por onde as formigas transportam para a sede da colônia o material cortado.

No intensivo combate à formiga saúva devemos lançar mão de todos os meios ao nosso alcance, não nos esquecendo, pois, de seus inimigos naturais que são os nossos melhores auxiliares no trabalho de debelação de tão terrível praga. Faz-se mister proteger os animais e aves selvagens insetívoros e as aves domésticas, que na época da enxameagem dão combate tenaz às tanajuras.

Afim de se evitar ou antes limitar a fundação de novos formigueiros, torna-se necessário adotar algumas medidas que resumiremos a seguir:

1. Eliminação dos formigueiros velhos antes da época da enxameagem.

2. Catação manual das tanajuras nos dias em que se verifica o vôo nupcial. Trabalho esse realizável pelas crianças nas fazendas.

3. Alguns dias após a enxameagem, um trabalhador com apenas poucos golpes de enxada poderá, eliminando a icá, impedir o estabelecimento de um formigueiro.

4. Os grandes saúveiros, que até então escaparam à ação vigilante do fazendeiro avisado, poderão ser extintos pelo emprego de processos químicos.

Em vista da grande diversidade de métodos e processos atualmente usados no combate à formiga saúva, do número

relativamente alto de tipos de formicidas e máquinas comerciais á venda no mercado e das variadas recomendações para o emprego destes diversos formicidas, máquinas e processos resolvemos iniciar experiências práticas sobre os métodos de extinção da saúva, afim de determinar, dentro das possibilidades existentes, os seguintes pontos:

1. A eficiência de vários processos e formicidas comerciais recomendados para a extinção da saúva
2. A economia dos vários processos, baseada na quantidade e preço do formicida usado, na mão de obra necessária para cada tratamento, na quantidade e custo de materiais acessórios e no preço original da máquina e dos demais aparelhos necessários.
3. A conveniência relativa dos diversos métodos, considerando, entre outros fatores, inocuidade para o operador, facilidade de transporte do equipamento, necessidade de materiais acessórios, simplicidade do tratamento e tipo de trabalho exigido
4. O melhor tipo de formicida a ser empregado sob as diversas condições climáticas
5. O melhor tipo de máquina para o emprego em vários tipos de solo
6. Fatores que limitam o uso dos diversos processos.
7. A maneira mais eficiente, econômica e conveniente com relação ao uso de cada processo, sendo investigado, inclusive o número de injeções por metro quadrado, a quantidade de formicida por injeção e a maneira de aplicação.

O presente artigo expõe os resultados da primeira parte das experiências realizadas com nove processos atualmente usados, na extinção da formiga saúva.

## Métodos

### Formigueiros

Devido ao número relativamente alto de processos a serem experimentados, tornou-se necessário limitar a 5, o número de formigueiros a serem tratados com cada processo ou sub-processo. Ao completar os tratamentos com todos os métodos disponíveis, será repetida mais uma série de 5 formigueiros com cada processo que se mostrar eficiente, afim de se verificarem por maior número de dados e análises mais compreensíveis os resultados obtidos.

Para que fossem feitos, na medida do possível, todos os tratamentos sob condições idênticas, os formigueiros experimentais foram escolhidos dentre os que tinham de 3 a 6 anos de idade e apresentavam de 12 a 36 metros quadrados

de terra solta. Na escolha de 5 formigueiros a serem tratados com um determinado processo, foi feita uma seleção de maneira que o total de número de metros quadrados atingisse a cerca de 100 por série, ou seja uma média de 20 metros quadrados por formigueiro. Em cada série, também, selecionaram-se saueiros, localizados nos diversos tipos de terreno, de tal maneira a não haver discriminação em favor de um ou outro processo, quanto á facilidade ou dificuldade da extinção das amostras escolhidas.

Foram usados somente formigueiros da espécie *Atta sexdens* e as aplicações foram limitadas áqueles que nunca foram atacados anteriormente nem tão pouco sofreram ataque por tatús ou outros animais insetívoros.

### Processos

Os resultados dos nove processos descritos aquí foram obtidos de tratamentos de 45 formigueiros experimentais nos campos da Escola e nas circunvizinhanças. As aplicações foram feitas nos meses de Agosto, Setembro e Outubro pouco antes da época da revoada nesta região.

Nesta experiência usamos três máquinas comerciais: «Agri-defesa», «Taxa» e «Werneck» e quatro formicidas: bissulfureto de carbono puro, formicida São Thomé, uma mistura de arsênico e enxofre, e enxofre puro. Para se determinar o valor do processo auxiliar do trado, os tratamentos foram duplicados em canal artificial e natural, de maneira que cada máquina foi aplicada em 10 formigueiros (5 em canal natural e 5 em canal de trado).

### Escolha dos Canais

Afim de se estandardizar os tratamentos com os diversos processos, relativamente ao número de injeções por formigueiro, adotámos a tabela reproduzida na página seguinte, que é o resultado de vários anos de prática na extinção da sauva pelos diversos processos.

Esta tabela foi rigorosamente seguida durante as experiências. As dimensões da terra solta do saueiro foram determinadas, medindo-se o seu maior comprimento e largura, calculando-se a seguir, a área, em metros quadrados. Usando-se a tabela, verificou-se o número de injeções necessárias para o tratamento do saueiro, quer seja pela aplicação em

Área da terra solta em metros quadrados	Número de canais tratados
1	1
2 — 3	2
4 — 6	3
7 — 9	4
10 — 12	5
<u>13</u> — <u>18</u>	<u>6</u>
<u>19</u> — <u>26</u>	<u>7</u>
27 — 40	8
41 — 60	9
61 — 100	10

Tabela 1. Relação entre o Tamanho do Sauveiro e o Número de Injeções.

canal natural ou em canal de trado. Localizados os pontos onde deveria ser aplicado o formicida, foram escolhidos os canais naturais (ou fizeram-se canais de trado), equidistantes, um pouco para dentro dos limites da terra solta, em redor da referida área. Cuidou-se sempre da aplicação do inseticida em um ou mais canais no centro do saúveiro (quando um formigueiro necessita de 8, 9 ou 10 injeções, dois canais no centro são tratados). Deste modo, num formigueiro a ser atacado em 5, 6 ou 7 canais, um destes foi localizado no centro e os outros um pouco dentro das margens de área determinada pela terra solta (Fig. 1).

O critério adotado na seleção dos canais naturais, foi baseado nos característicos de um bom canal, característicos estes, que consideramos de grande importância; que são:

1. Ser vertical ou pouco oblíquo.
2. Ser reto ou pouco sinuoso.
3. Ter, pelo menos, de 3 a 4 cms. de diâmetro e 80 cms. de profundidade, no mínimo, quando medido por uma varinha flexível.
4. Apresentar grande movimento de formigas grandes e pequenas.

No ataque a um formigueiro por meio de canal natural, o numero necessário de canais, do tipo acima referido, foi localizado, cavando-se ligeiramente a superfície da terra solta com a enxada. Os canais assim descobertos, foram fe-

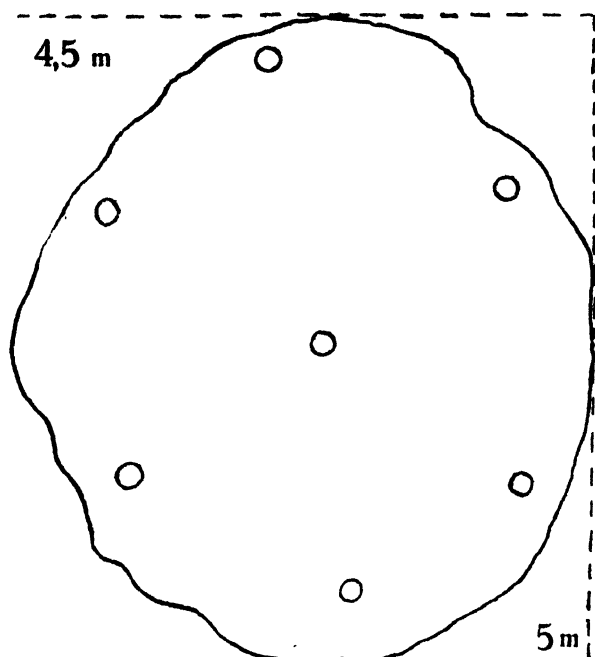


Fig. 1. Localização dos canais (feitos artificialmente ou naturais), para o tratamento de um saueiro com, aproximadamente, 22 metros quadrados de terra solta

chados com uma «rolha» de mato ou capim para se evitar a saída de muitos indivíduos, sendo o local em torno do orifício, imediatamente limpo e preparado para a aplicação do formicida. Esta rolha foi removida somente no momento de se iniciar a aplicação do formicida, permanecendo fechados os outros canais. Após terminado o tratamento num canal, foi este seguramente tampado com terra, afim de prevenir o escapamento do gás já formado e não diminuir a eficiência das aplicações nos outros canais. Durante as aplicações, foram socados os olheiros do formigueiro que indicavam a saída do gás, afim de se prevenir o escapamento do formicida.

Com relação aos tratamentos feitos em canal de trado, a localização dos furos seguiu a mesma orientação que a dos canais naturais. Em nossas experiências, usaram-se trados de 4 polegadas, com cabo de um metro, e mais um metro de extensão, para a construção dos furos. Os caracteres de um bom canal artificial são os seguintes:

1. Ser de 10 cms. (ou 4 polegadas), mais ou menos, de diâmetro.
2. Ser de 2 metros de profundidade.
3. Atravessar canais e panelas do formigueiro.
4. Mostrar grande movimento de formigas grandes e pequenas
5. Os furos localizados na periferia da terra solta serem ligeiramente inclinados para o centro do formigueiro
6. O canal ou os canais do centro serem verticais

Nos tratamentos em que se usou canal de trado, foram feitos os referidos furos, ou na véspera do dia da experiência, ou algum tempo antes da aplicação do formicida. Em ambos os casos, os orifícios dos canais ficaram fechados até o momento da injeção, e foram seguramente tampados ao terminar a aplicação do inseticida.

#### Máquinas, Formicidas e Maneira de Aplicação

A seguir, daremos uma ligeira descrição dos processos experimentados nesta primeira parte das investigações, bem como um sumário da maneira de usar cada um dos processos.

##### 1. Máquina Agridefesa

A Máquina Agridefesa, recomendada pelo Serviço de Defesa Sanitária Vegetal do Departamento Nacional da Produção Vegetal, funciona sob o princípio da gaseificação de bissulfureto de carbono, pela passagem duma corrente de ar através uma câmara fechada que contem o inseticida. A corrente de ar é produzida por meio duma bomba, acionada aceleradamente. Segundo os esclarecimentos fornecidos pelo Serviço de Defesa Sanitária Vegetal, esta máquina gaseifica 500 cc. de bissulfureto de carbono em 20 minutos.

A maneira pela qual este aparelho foi usado em nossas experiências, acha-se traçada em linhas abaixo. Para se iniciar o tratamento, retirou-se o tubo mais grosso e, com uma vasilha graduada, despejaram-se 700 cc. de bissulfureto de carbono no depósito do extintor. Colocando-se o aludido tubo no respectivo lugar, introduziu-se a sua extremidade livre num canal previamente escolhido e chegou-se-lhe terra ao redor

para que fosse evitado, assim, o encapamento do gás. Fez-se funcionar a máquina durante 10 minutos em cada canal, sendo que, por esta forma, foram gaseificados aproximadamente 250 cc. de bissulfureto de carbono por injeção. De 20 em 20 minutos de contínuo funcionamento, descarregou-se o extintor, retirando-se as partículas de gelo que se formaram; isto feito, foi posto no depósito, o líquido restante, adicionando-se-lhe mais 500 cc. de bissulfureto de carbono.

Duas séries de tratamentos foram realizados com a Máquina Agridefesa: 5 formigueiros tratados por meio de canal natural e 5 por canal artificial.

## 2 Máquina Taxa

A Máquina Taxa é um aparelho que emprega o princípio básico de gaseificação dum formicida patente, por meio de calor, gerado no próprio aparelho. O inseticida existente no depósito da máquina, devido á pressão produzida por uma bomba, é forçado a passar para um tubo de borracha cuja extremidade acha-se ligada a um tubo mais fino de metal que por sua vez tem ligação direta com uma peça do mesmo material cujo interior é constituído de uma câmara alargada. Nesta câmara, devido á alta temperatura produzida pela chama de um maçarico, verifica-se a troca do estado físico do formicida, de líquido para gás, determinando destarte um grande aumento de pressão que força a saída do inseticida, do bico do aparelho, em forma de uma branca e densa nuvem de gás.

O formicida São Thomé, usado na Máquina Taxa, é uma mistura de bissulfureto de carbono e hidrocarburetos, mistura esta que combina toxicidade com adesividade. Os gases provenientes dos hidrocarburetos, além de possuírem propriedades tóxicas, são de grande valor na fixação do inseticida ás paredes dos canais e painéis, bem como auxiliam sua deposição nos jardins do fungo.

A Máquina Taxa foi usada durante 5 minutos em cada canal ou seja uma média de, aproximadamente, 30 cc. de formicida São Thomé, gaseificados por injeção. Este aparelho também foi empregado em duas séries de tratamentos: 5 formigueiros por meio de canal natural e 5 por canal de trado.

## 3. Máquina Werneck

A Máquina Werneck, relativamente bem conhecida entre



os lavradores, funciona sob o princípio básico da insuflação do formicida em forma de gás. O formicida, geralmente em pacotinhos de papel, é queimado num fogareiro com carvão vegetal (fornilho), e os gases gerados por esta combustão, são levados através da mangueira por uma corrente de ar produzida pelo acionamento de uma manivela ligada a uma ventoinha. Esta manivela é tocada de molde a se obter 45 rotações por minuto. A ponta livre da mangueira, introduzida no orifício de um canal, liberta os gases para o interior do formigueiro.

O formicida geralmente usado nesta máquina é uma mistura de arsênico branco com enxofre, cujas proporções variam segundo as recomendações de diversos autores. Em nossas experiências, usamos somente a mistura de arsênico branco e enxofre na proporção de uma parte do primeiro para três do segundo. A carga, por injeção, foi limitada a 200 gramas, quantidade esta de inseticida insuflada pela máquina, em 5 minutos de funcionamento. Foram realizadas 3 séries de tratamentos com a Máquina Werneck, usando-se uma carga de 200 gramas de arsênico branco e enxofre puro em canal artificial.

#### 1. Via líquida

É bastante conhecido o método de extinção da saúva pelo tratamento por via líquida sem o emprego de qualquer máquina. O princípio usado baseia-se simplesmente na evaporação do inseticida devido á temperatura ambiente. Quasi todos os formicidas comerciais, vendidos em forma líquida e aconselhados no tratamento por via direta, contêm bissulfureto de carbono como o agente tóxico. Foi usado, nas experiências aquí descritas, o bissulfureto de carbono puro, 250 cc. (ou 318 gramas) por canal.

Nos formigueiros tratados por meio de canal natural, foram postos 10 litros de água em cada canal, sendo logo após aplicado o formicida. A água tem por função umidecer e impermeabilizar as paredes dos canais, evitando-se, em parte, o desperdício do líquido devido á absorção por parte das suas paredes, resultando em uma redução na eficiência do tratamento. Logo após ser despejada a água no canal, os 250 cc. de bissulfureto de carbono foram derramados no orifício e o canal imediatamente tapado.

Nos tratamentos por via líquida em canal de trado, os 250 cc. de bissulfureto de carbono foram despejados no

canal de maneira que o inseticida correu pelas paredes, em toda a sua extensão. Nesta série de tratamentos não foi feito o uso de água. Foram tratados 5 formigueiros por via líquida em canal natural e um número igual em canal artificial.

A Tabela II sumaria alguns pontos gerais sobre a aplicação destes 9 processos experimentados na primeira parte do programa de investigações dos métodos para a extinção da formiga saúva.

Processo			Formicida			Combustível	
Máquina	Canal	Minutos por canal	Tipo	Preço	Por canal	Tipo	Por canal
Agridefosa	Natural	10	CS <sub>2</sub> puro	3\$000 kg	250 cc	—	—
Agridefosa	Artificial	10	CS <sub>2</sub> puro	3\$000 gr	250 cc	--	--
Taxa	Natural	5	S. Thomé	4\$167 L.	300 cc	Gasolina	35 cc
Taxa	Artificial	5	S. Thomé	4\$167 L.	300 cc	Gasolina	35 cc
Werneck	Natural	5	As <sub>2</sub> O <sub>3</sub> : S	1\$350 kg	200 gr	Carvão	200 gr
Werneck	Artificial	5	As <sub>2</sub> O <sub>3</sub> : S	1\$350 kg	200 gr	Carvão	200 gr
Werneck	Artificial	5	Enxofre	\$800 kg	200 gr	Carvão	200 gr
	Natural		CS <sub>2</sub> puro	3\$000 kg	250 gr	—	—
(Trado)	Artificial	—	CS <sub>2</sub> puro	3\$000 kg	250 cc	-	

Tabela II. Processos, Máquinas e Formicidas Usados

Para maior facilidade no julgamento dos resultados nas bases de eficiência, economia e conveniência dos diversos processos, fichamo-los, sendo que os dados seguintes foram anotados, para cada um dos 45 formigueiros experimentados.

Condições do tratamento: série (máquina, formicida, tipo de canal, número do formigueiro), data, tem-

peratura, umidade relativa, condições do dia, tipo e condição do solo, topografia do formigueiro, dimensões da terra solta, área e grau de atividade.

**Tratamento:** necessidade de limpeza do formigueiro, número de injeções; combustível — tipo, preço, quantidade e custo; formicida — quantidade e custo; trabalho — horas e custo total; o custo total do tratamento, baseado em um formigueiro padrão de 7 injeções.

**Resultados:** data da abertura, conclusão (extinto ou vivo), painéis inspeccionados e número de dias transcorridos entre o tratamento e a abertura.

A maioria dos tratamentos foi feita sob condições semelhantes. Em quasi todos os casos, o formicida foi aplicado durante as horas de sol forte. Nenhum tratamento foi realizado em dia frio ou chuvoso. Todos os saúveiros foram estabelecidos em solo argilo-silicoso. A topografia do terreno em que se achavam localizados os diversos formigueiros, variou dentro de uma determinada série de tratamentos, de acordo com a explicação dada em linhas anteriores. Somente os formigueiros ativos foram tratados.

Na maioria dos casos, a limpeza do formigueiro não foi necessária, devido aos tipos de processos experimentados e á localização do saúveiro. A quantidade do combustível usada foi pesada ou medida para cada tratamento e o seu custo calculado de acordo com o preço no mercado. A quantidade de formicida foi também cuidadosamente medida e o custo por tratamento, calculado nas seguintes bases:

Formicida São Thomé . . . . .	50\$000 por caixa de 12 litros
Bissulfureto de carbono puro . . . . .	3\$000 por quilo
Asênico branco . . . . .	3\$000 por quilo
Enxofre . . . . .	\$800 por quilo

A mão de obra foi calculada na base de \$500 por hora por homem, tendo sido tomado o número de horas de trabalho, necessário para fazer o tratamento completo, inclusive limpeza (quando necessária), preparação dos canais, preparação da máquina, injeções, etc. O custo total do tratamento foi a soma dos três fatores: custo do combustível, custo da mão de obra e custo do formicida. Para finalidade de comparação sob a base de economia, todos os custos totais foram reduzidos a uma base final representada por um formigueiro padrão de 7 injeções.

Os resultados dos tratamentos foram obtidos, abrindo-se os formigueiros e inspecionando-se uma amostra representativa de painéis e canais. Todos os saúveiros experimentais foram cavados entre 50 e 130 dias depois de ter sido feita a aplicação. Na abertura, fe-se um corte no sentido do maior diâmetro do formigueiro, atravessando todo o seu comprimento.

Este corte foi de 1,5 metros de largura e de uma profundidade igual á maior profundidade do saúveiro. Em todos os casos, um mínimo de 50 painéis foi inspecionado, sendo que na maioria, o número foi muito superior a este. Considerou-se extinto o saúveiro em que não se encontrou qualquer formiga viva, e que apresentou as painéis com o fungo morto. Ao se encontrar uma formiga viva de qualquer casta, dentro do formigueiro, considerou-se o tratamento deficiente, e julgou-se o formigueiro vivo.

Dois meses após terem sido abertos os formigueiros, percorreu-se mais uma vez todos eles afim de se confirmar os resultados da escavação.

A segunda parte da experiência já se acha em andamento, abrangendo um plano para o tratamento de cerca de 120 formigueiros, inclusive algumas séries da primeira experiência que serão repetidas, bem como usados outros processos diferentes, tipos de máquinas, formicidas, etc.

## Resultados

### A Base de Julgamento

Para melhor julgamento dos resultados dos nove tratamentos, foi idealizada uma tabela de pontos, afim de que a colocação final pudesse ser feita independente de erros ou de opiniões pessoais. Dá-se a seguir um sumário do critério adotado no julgamento final dos processos usados, tabela esta, que será também adotada no julgamento das experiências que atualmente se acham em andamento sobre o mesmo assunto.

Nestas bases, um processo que extinguiu os 5 formigueiros recebeu 65 pontos. Se dos 5 formigueiros, 4 foram extintos, recebeu 52 pontos, 39 pontos para 3, etc. Na base de economia, o custo total para o tratamento dum formigueiro de 7 canais valeu 19 pontos e o custo anual do aparelho valeu 4 pontos, calculado do preço original do aparelho, dividido pelo número de anos de serviço prestado.

Critério	Pontos
<b>Eficiência</b>	
Porcentagem dos formigueiros extintos	65
<b>Economia</b>	
a) Custo do formicida por formigueiro .....	---
b) Custo da mão de obra por formigueiro ...	---
c) Custo do combustível por formigueiro ....	---
1) Custo total por formigueiro.....	19
2) Custo do aparelho por ano .....	4
Total .... .	23
<b>Conveniência</b>	
1) Inocuidade para o operador .....	4
2) Transporte do equipamento (peso total)	3
3) Simplicidade do tratamento .....	2
4) Necessidade de materiais acessórios ....	2
4) Tipo de trabalho exigido .....	1
Total.....	12
Pontos Totais .. .	100

Tabela III. Bases para o Julgamento dos Resultados

Considerados sob o ponto de vista da conveniência, os processos foram julgados, levando-se em consideração o grau de inocuidade para o operador (perigo de envenenamento, explosão, etc.), a dificuldade de transporte do equipamento, total (baseada no peso total), a simplicidade do tratamento (conhecimentos especiais necessários, número de operações diferentes exigidas, facilidade de ensino, etc.) a necessidade de materiais acessórios (como: água, carvão, gasolina, etc.) e o tipo de trabalho exigido (facilidade ou dificuldade, etc.).

#### B. Eficiência

Os resultados com respeito á eficiência dos diversos processos são apresentados na Tabela IV, para que seja facilitada a comparação. Cada processo enumerado representa 5 tratamentos, sendo que cada formigueiro tem o valor de 20% ou seja 13 pontos.

Cinco dos nove processos usados, foram 100% eficientes sob as condições destas investigações. Dos quatro restantes, três foram ineficientes em um formigueiro e um processo falhou em dois formigueiros. Verificou-se que, nos tratamentos com o formicida São Thomé, na Máquina Taxa e com en-

Processo			Formigueiros		Eficiência	
Máquina	Formicida	Canal	Vivos	Mortos	Porcentagem	Pontos
Agridefesa	CS <sub>2</sub> puro	Artificial	0	5	100	65
Taxa	São Thomé	Natural	0	5	100	65
Werneck	As <sub>2</sub> O <sub>3</sub> : S :: 1:3	Artificial	0	5	100	65
(Direta)	CS <sub>2</sub> puro	Natural	0	5	100	65
(Trado)	CS <sub>2</sub> puro	Artificial	0	5	100	65
Agridefesa	CS <sub>2</sub> puro	Natural	1	4	80	52
Taxa	São Thomé	Artificial	1	4	80	52
Werneck	Enxofre	Artificial	1	4	80	52
Werneck	As <sub>2</sub> O <sub>3</sub> : S :: 1:3	Natural	2	3	60	39

Tabela IV. Eficiência dos Processos Experimentados

xofre puro na Máquina Werneck, alguns dos formigueiros deram enxame. Esta enxameagem ocorreu no período normal, juntamente com a de outros saueiros da região que não foram atacados. No caso dos formigueiros tratados com estes dois inseticidas, dentro de 20 dias antes da época normal de enxameagem, observou-se a revoada das içás e bitús. Sauveiros tratados com mais de 20 dias antes da época de enxameagem não deram enxame. Quasi todos os formigueiros que enxamearam depois do tratamento, ao serem abertos mais tarde

mostraram-se extintos. Explica-se este fenômeno pela natureza da ação tóxica do formicida.

E' provavel que o formicida São Thomé e o enxofre não tenham ação muito forte sobre as próprias formigas, mas que a sua ação principal seja sobre o fungo. Motivo este que poderá explicar a demora na extinção do saúveiro. As formas aladas, não sendo muito afetadas pelo tratamento, saem na época própria, mesmo dum formigueiro destinado a extinguir-se devido ao tratamento, previamente feito. A ação do inseticida, entretanto, continua sobre o fungo, e mais tarde morrendo este, o formigueiro torna-se extinto.

Os cinco saúveiros tratados com formicida São Thomé por meio da Máquina Taxa, em canal natural, ficaram todos extintos, quando abertos de 50 a 90 dias depois da aplicação. Não se notaram mais atividades na vizinhança destes formigueiros, nem mais o aparecimento das formas ápteras. Uns poucos dias depois da aplicação, dois destes formigueiros deram enxame. Mesmo estes dois, ao serem abertos, bem como os outros três, não mostraram a presença de qualquer formiga viva, e apresentaram ainda, todas as painéis com fungo morto e apodrecido.

Dos cinco formigueiros tratados com o formicida São Thomé, na Máquina Taxa em canal artificial, quatro foram extintos e um apresentou atividade de formigas em diversas painéis, ao ser aberto depois dum intervalo de 90 dias. Três destes formigueiros deram enxame, inclusive aquele em que o processo falhou. Não se encontra perfeita explicação para a falha neste formigueiro. Evidentemente, não houve uma boa distribuição dos gases em todas as suas partes, apesar de ter sido feita a aplicação em canal de trado. Muitas painéis apresentaram grande quantidade de formigas mortas e fungo apodrecido, enquanto em outras, as várias castas se achavam em franca atividade e o fungo vivo e em crescimento.

Os tratamentos com arsênico branco e enxofre (1:3), na Máquina Werneck em canal natural, foram somente 60% eficientes, sendo que dois dos formigueiros mostraram grande número de formigas em atividade ao término de 90 dias. A razão para a deficiência deste tipo de aplicação foi bem evidente, ao se estudar as condições interiores de um formigueiro recém-aberto. Até uma profundidade de aproximadamente 1 metro e 10 centímetros, todas as painéis apresentaram formigas e fungos mortos com enxofre sublimado nas

paredes dos canais e painéis. Abaixo deste nível, a maioria das painéis apresentou formigas em atividade e painéis com fungo vivo, não sendo possível achar traços do inseticida sublimado nas paredes. Estas condições mostraram que a mistura usada não penetrou muito mais do que 110 centímetros nestes formigueiros, devido á dificuldade em atravessar os canais escolhidos para a aplicação. Estes fatos mostram o valor do canal de trado, usado em conjunto com o processo de insuflação do inseticida.

Por outro lado, a série tratada com a mesma mistura de arsênico branco e enxofre pela Máquina Werneck em canal artificial apresentou êxito completo. Todas as painéis, até as mais profundas, mostraram as paredes cobertas pelo resíduo do inseticida, demonstrando que a mistura em forma de gás penetrou por todas as painéis e canais dos saueiros e matou as formigas e o fungo em todas as partes. Logicamente, a penetração para baixo seria mais fácil e rápida em canal de trado, devido a menor superfície para causar sublimação e ao fato de serem os canais retos, e não sinuosos como os naturais. Nenhum dos formigueiros tratados com arsênico branco e enxofre em canal de trado deu enxame.

O processo de insuflação de enxofre puro, pela Máquina Werneck em canal artificial, apresentou 80% de eficiência. Quatro formigueiros, relativamente grandes, foram extintos por este processo, sendo que o quinto continuou vivo. Quasi todos os saueiros desta série, tratados poucos dias antes da época de enxameagem, deram enxame de içás e bitús. Apesar disto, quatro deles estavam extintos, quando abertos uns 90 dias mais tarde. Em vista disto, seria lógico supor que a ação do enxofre se manifesta principalmente sobre o fungo, sendo que as formigas são diretamente pouco afetadas. É geralmente conhecido que o enxofre é um fraco inseticida e um bom fungicida, fato este que sustenta esta hipótese. Os resultados destes tratamentos com enxofre puro, mostram que esta substância tem valor no combate á formiga saua, mas para ser usado mais eficientemente, deve ser empregado em mistura com arsênico branco. A combinação destas duas substâncias resulta num formicida-fungicida que tem ação tóxica sobre as próprias formigas, bem como forte ação sobre o fungo.

A Máquina Agridefesa em canal natural, usando o bissulfureto de carbono puro, foi 80% eficiente. Um formigueiro



de 18 metros quadrados apresentou formigas vivas e ativas em várias panelas, ao ser aberto depois dum intervalo de 150 dias. Explica-se a sobrevivência deste saúveiro pela hipótese de não se ter conseguido a completa distribuição dos gases do bissulfureto de carbono, quando aplicado em canal natural. As panelas ainda em atividade foram localizadas em várias partes do fundo do formigueiro, indicando que a falha não foi devida à ineficiência da aplicação num só canal qualquer.

As duas séries, tratadas com bissulfureto de carbono puro por via líquida, foram todas extintas. Nenhum dos 10 formigueiros destas séries deu enxame, nem mostrou atividade qualquer depois da aplicação do inseticida por via líquida. Sob as condições e limites destas experiências, não houve diferença alguma na eficiência deste inseticida, quer seja em canal natural ou em canal de trado. Ambas as maneiras de aplicação do bissulfureto de carbono, extinguiram os cinco formigueiros, foram portanto, 100% eficientes e receberam 65 pontos pela eficiência. Prefere-se, no entanto, a aplicação do bissulfureto de carbono em canal de trado, porque a evaporação e distribuição do gás são mais perfeitas e podem evitar falhas nos tratamentos, especialmente, mesmo sob condições um pouco desfavoráveis a este processo.

### C. Economia

A Tabela V sumaria os itens do custo dos tratamentos, bem como o custo total de aplicação num formigueiro padrão, que necessita de 7 injeções (19 a 26 metros quadrados).

O processo mais barato, usado nestas experiências, foi o da insuflação de enxofre puro pela Máquina Werneck em canal de trado. Insuflaram-se 200 gramas de enxofre em cada canal (ou 1\$120 para um formigueiro padrão de 7 canais). A quantidade de combustível, necessária para a injeção num canal é de, aproximadamente, 200 gramas de carvão vegetal (\$040 por canal ou \$280 por formigueiro). Em média, cerca de 3 horas e 45 minutos, são necessários para a aplicação deste processo, ou calculando-se na base de \$500 por hora, a mão de obra ficaria em 1\$855 por formigueiro. O custo total deste tratamento é de \$465 por canal, ou 3\$255 para o tratamento dum formigueiro médio, medindo entre 19 e 26 metros quadrados.

Processo			Combustível			Trabalho			Formicida			Total	
Máquina	Formicida	Canal	Tipo	Quant.	Custo	Horas	Custo	Quantid.	Custo	Custo	Pontos		
Werneck	Enxofre	Artificial	Carvão	1.400 gr	\$290	3,71	\$855	1.400 gr	\$1120	\$3255	19,0		
Werneck	As <sub>2</sub> O <sub>3</sub> : S :: 1:3	Natural	Carvão	1.100 gr	\$280	2,54	\$70	1.400 gr	\$890	\$3440	18,2		
Werneck	As <sub>2</sub> O <sub>3</sub> : S :: 1:3	Artificial	Carvão	1.400 gr	\$280	4,94	\$2020	1.400 gr	\$890	\$4190	14,6		
(Direta)	CS <sub>2</sub> puro	Natural	—	—	\$000	2,51	\$255	2.224 gr	\$6672	73927	7,9		
(Trado)	CS <sub>2</sub> puro	Artificial	—	—	\$000	2,60	\$300	2.223 gr	\$6672	73972	7,8		
Agridefesa	CS <sub>2</sub> puro	Natural	—	—	\$000	3,62	\$910	2.178 gr	\$6534	83344	7,4		
Agridefesa	CS <sub>2</sub> puro	Artificial	—	—	\$000	3,98	\$990	2.225 gr	\$6675	85665	7,1		
Taxa	São Thomé	Artificial	Gasolina	280 cc	\$333	3,50	\$750	2.115 cc	\$8813	108896	5,7		
Taxa	São Thomé	Natural	Gasolina	246 cc	\$334	3,47	\$735	2.117 cc	\$9072	111511	5,6		

Tabela V. Economia relativa dos processos experimentados (Baseada em 7 injeções)

Os tratamentos com a mistura de arsênico branco e enxofre na proporção de 1 para 3, aplicada na base de 200 gramas por canal, foram, também relativamente baratos. Esta mistura, cujo custo é de 1\$350 por quilo, corresponde a \$270 por canal e 1\$890 por formigueiro. O carvão vegetal, usado como combustível, é gasto na quantidade de 200 gramas para a insuflação duma carga, ou \$040 por canal e \$280 por formigueiro. A aplicação por meio de canal natural é bastante mais rápida (mas muito menos eficiente), sendo que um formigueiro médio pode ser tratado em duas horas e meia com um custo de 1\$270 de mão de obra. O custo total desse processo é de 3\$440 por formigueiro, ou seja \$491 por canal.

Este processo em canal de trado, é um pouco mais moroso, mas apresenta uma eficiência de 100%. São gastas, em média, cerca de 4 horas para o tratamento em canal de trado (2\$020 para a mão de obra). O custo total da aplicação de arsênico branco e enxofre em canal artificial empregando-se a Máquina Werneck, é de 4\$190 por formigueiro, ou \$599 por canal.

O método de extinção dos saúveiros pela aplicação de bissulfureto de carbono, por via líquida, foi de custo médio em comparação com os outros processos experimentados. O bissulfureto de carbono foi usado na base de 250 cc. por injeção, ou seja 2.224 gramas de inseticida por formigueiro (tanto em canal natural como em canal de trado). O custo do formicida, baseado no preço de 3\$000 por quilo, seria de 6\$672 por formigueiro, ou \$953 por canal. O processo de aplicação por via direta em canal natural é mais rápida, exigindo cerca de duas horas e meia para a preparação do formigueiro e aplicação do formicida (1\$255 para a mão de obra por formigueiro). Nestas bases, o custo total do tratamento por via direta em canal natural é de 7\$927 por formigueiro, ou 1\$132 por canal.

O tratamento por via líquida, em canal artificial, é um pouco mais lento devido ao tempo necessário para a construção dos canais. Empregando-se este processo, gastam-se, em média, duas horas e 40 minutos por formigueiro (1\$300 para a mão de obra). O custo total é de 7\$972 por formigueiro, ou 1\$139 por canal.

A Máquina Agridefesa gaseificou 311 gramas de bissulfureto de carbono puro por canal, quando aplicada duran-

te 10 minutos em canal natural. O custo do inseticida neste processo, é de 6\$534 por formigueiro médio, ou seja \$933 por canal. O tempo necessário para o tratamento dum sauveiro é de, aproximadamente, 3 horas e 35 minutos, dando um custo de 1\$810 para a mão de obra. O custo total do processo da Máquina Agridefesa em canal natural é de 8\$344 por formigueiro, ou 1\$192 por injeção.

A Máquina Agridefesa em canal de trado gaseificou, em 10 minutos, 318 gramas de bissulfureto de carbono. Neste caso, o custo do formicida é de \$954 por canal e 6\$675 por sauveiro. O tempo necessário para o tratamento dum formigueiro no qual são aplicadas 7 injeções com esta máquina, em canal artificial, é de, aproximadamente, 4 horas (1\$990 para a mão de obra). O custo total do processo fica em 8\$665 por formigueiro médio, sendo que o custo por canal é de 1\$238.

Os tratamentos feitos nestas experiências com a Máquina Taxa, foram os mais dispendiosos, devido ao preço relativamente alto do formicida São Thomé (50\$000 por caixa de 12 litros, ou seja 4\$167 por litro). A máquina Taxa, funcionando 5 minutos em canal natural, gaseificou uma média de 311 cc. do formicida, que teria um custo de 1\$296 por canal, ou 9\$072 por formigueiro. Para a gaseificação deste formicida, usaram-se 35 cc. de gasolina por canal, ou 246 cc. deste combustível por formigueiro. O custo do combustível foi de \$344 por formigueiro, ou \$049 por canal. Foram gastas, em média, 3 horas e 28 minutos para o tratamento dum formigueiro padrão, ou seja um custo de 1\$735 para a mão de obra. A despesa total deste processo é de 11\$150 por sauveiro ou seja 1\$593 por canal.

Funcionando durante 5 minutos em canal de trado, esta máquina gaseificou 302 cc. de formicida São Thomé, ou seja, um custo de 8\$813 para o formicida, por sauveiro e 1\$259 por canal. Para esta gaseificação queimaram-se 34 cc. de gasolina por canal, sendo o custo do combustível de \$333 por formigueiro e \$048 por canal. Para os tratamentos em canal artificial foram gastas 3 horas e meia por sauveiro (1\$750 para a mão de obra). O custo total do tratamento com a Máquina Taxa em canal de trado ficou em 10\$896 por formigueiro e 1\$557 por canal.

Na consideração da economia relativa dos vários processos, foi incluído, também, o custo anual do aparelho empre-

Tratamento		Máquina			Trado	Aparelho
Máquina	Canal	Preço	Anos	Annual	Annual	Custo Annual Total
(Direta)	Artificial	—	—	\$000	—	\$000
Agridefesa	Natural	20\$000	4	5\$000	—	5\$000
(Trado)	Artificial	—	—	\$000	32\$000	32\$000
Agridefesa	Artificial	20\$000	4	5\$000	32\$000	37\$000
Werneck	Natural	320\$000	6	53\$333	\$000	53\$333
Taxa	Natural	350\$000	5	70\$000	\$000	70\$000
Werneck	Artificial	320\$000	6	53\$333	32\$000	85\$333
Taxa	Artificial	350\$000	5	70\$000	32\$000	102\$000

Tabela VI. Custo anual do aparelho

gado. Para se calcular este custo, foi tomado o preço original da máquina e o número de anos de serviço que a máquina provavelmente poderia prestar. O período útil de um trado foi calculado em um só ano. Os pontos acima referidos acham-se apresentados na Tabela VI.

#### D. Conveniência

Nenhum dos processos oferece inocuidade completa ao operador. Os tratamentos que empregam o bissulfureto de carbono puro apresentam não só a possibilidade de prejudicar o operador devido á toxicidade do gás, como também o perigo do fogo, sendo que o líquido e os seus gases são inflamáveis e mesmo explosivos. A aplicação deste formicida por via líquida é considerada mais perigosa do que a aplicação por meio de máquina. O formicida São Thomé também gera gases prejudiciais á saúde do homem. Este preparado, devido á natureza de seus componentes é inflamável e explosivo, mas as explorações são menos violentas e de

menor perigo que as do bissulfureto de carbono puro. Os formicidas usados na Máquina Werneck não são explosivos nem inflamáveis, mas os gases gerados são perigosos ao operador quando aspirados. Consideramos o processo da Máquina Werneck com o emprego do enxofre puro, o menos perigoso dos nove processos experimentados.

O tratamento que demonstrou ser mais fácil sob o ponto de vista de transporte do aparelho foi o tratamento por via líquida em canal de trado. Para este tratamento, são necessários somente um trado, uma enxada e o bissulfureto de carbono. A Máquina Agridefesa, aparelho leve, também oferece vantagens neste ponto. Para os tratamentos com este aparelho em canal natural, são necessários, além da máquina, somente uma enxada e as latas do inseticida. Nos tratamentos em canal artificial, deve-se adicionar um trado ao equipamento.

A Máquina Taxa, pouco mais pesada do que a Agridefesa, também não apresenta dificuldades no transporte, sendo que se necessita da máquina, enxada, formicida São Thomé e alguns centímetros cúbicos de gasolina para a aplicação em canal natural, e mais o trado para aplicação em canal artificial. A Máquina Werneck é um aparelho bastante pesado que apresenta certas dificuldades de transporte. O equipamento total para o tratamento pesa cerca de 40 quilos para a aplicação em canal natural e 46 quilos em canal artificial. O material necessário consiste na Máquina Werneck, enxada, aproximadamente 1.400 gramas de carvão vegetal e igual quantidade da mistura a ser insuflada e o trado, no caso do tratamento em canal artificial.

O processo mais inconveniente experimentado foi o da aplicação do bissulfureto de carbono por via direta em canal natural. Além da enxada e do formicida, são necessários 10 litros d'água por canal, ou sejam 70 litros por formigueiro médio. No caso de um formigueiro afastado de uma fonte d'água, a dificuldade no transporte desta torna-se de bastante importância. Por outro lado, os tratamentos de formigueiros localizados perto de água, são de uma conveniência apreciável, devido ao pouco material requisitado por este processo.

Relativamente a simplicidade do tratamento, consideramos os processos que empregam canal de trado um pouco mais simples que os que usam canal natural. Os tratamentos que exigem conhecimentos especiais de máquinas e a preparação de

misturas em proporções exatas são considerados como mais complexos e um pouco mais difíceis de serem ensinados ao operador, do que os que não necessitam destas operações especiais.

Processo			Critérios de Julgamentos e Pontos					
Máquina	Formicida	Canal	Inocuidade	Transporfe	Simplificidade	Materiais	Tipo de trabalho	Pontos Totais Dados
(Trado)	CS <sub>2</sub> puro	Artificial	2,3	3,0	1,9	1,7	0,7	9,6
Agridefesa	CS <sub>2</sub> puro	Natural	2,7	2,8	1,6	2,0	0,2	9,3
Taxa	S. Thomé	Natural	3,0	1,7	1,6	1,8	0,8	8,9
Werneck	Enxofre	Artificial	3,8	0,6	1,5	1,6	0,5	8,0
Werneck	As <sub>2</sub> O <sub>3</sub> : S	Natural	3,2	0,8	1,4	1,8	0,7	7,9
Taxa	S. Thomé	Artificial	2,9	1,2	1,7	1,6	1,6	9,0
Agridefesa	CS <sub>2</sub> puro	Artificial	2,7	1,6	1,7	1,7	0,1	7,8
Werneck	As <sub>2</sub> O <sub>3</sub> : S	Artificial	3,2	0,6	1,5	1,6	0,5	7,4
(Direta)	CS <sub>2</sub> puro	Natural	2,4	0,5	1,8	0,1	0,9	5,7

Tabela VII. Julgamento dos Processos na Base de Conveniência

O material acessório para o tratamento, também foi considerado como um critério para o julgamento dos processos na base de conveniência. Tratamentos como o da Máquina Agridefesa que não exigem coisa alguma além da máquina, enxada e formicida são considerados mais convenientes do que outros que necessitam de água, carvão, gasolina, trado, etc.

Com relação ao tipo de trabalho necessário, foi considerada principalmente a dificuldade da mão de obra. A esse respeito, a aplicação do formicida por via líquida e por ga-

seificação pela Máquina Taxa, em canal, exemplificam tipos de trabalho bastante facil. Os tratamentos em canal artificial são um pouco mais difíceis, devido à necessidade de se fazer os furos a trado. As máquinas que exigem mão de obra contínua, apresentam exemplos de trabalho mais difícil, como o da Máquina Werneck e especialmente a Máquina Agridefesa.

Processo					Julgamento Final					
			Eficiência		Economia					
Máquina	Formi- cida	Canal	%	Pon- tos	Custo por Formi- gueiro	Custo Anual do Aparelho	Pontos	Conve- niência Pontos	PONTOS TOTALS	
Werneck	As <sub>2</sub> O <sub>3</sub> :S	Art.	100%	65,0	4\$190	85\$	15,2	7,4	87,6	
(Trado)	CS <sub>2</sub> puro	Art.	100%	65,0	7\$972	32\$	10,5	9,6	85,1	
(Direta)	CS <sub>2</sub> puro	Nat.	100%	65,0	7\$927	0\$	11,9	5,7	82,6	
Agridefesa	CS <sub>2</sub> puro	Art.	100%	65,0	8\$665	37\$	9,6	7,8	82,4	
Taxa	S. Thomé	Nat.	100%	65,0	11\$151	70\$	6,8	8,9	80,7	
Werneck	Enxofre	Art.	80%	52,0	3\$255	85\$	19,6	8,0	79,6	
Agridefesa	CS <sub>2</sub> puro	Nat.	80%	52,0	8\$314	5\$	11,2	9,3	72,5	
Werneck	As <sub>2</sub> O <sub>3</sub> :S	Nat.	60%	39,0	3\$440	53\$	20,1	7,9	67,0	
Taxa	S. Thomé	Art.	80%	52,0	10\$356	102\$	6,0	8,0	66,0	

Tabela VIII Julgamento Final dos Nove Processos

A Tabela VII mostra os resultados do julgamento dos nove processos, baseado na conveniência dos tratamentos, segundo os critérios adotados.

#### E. Julgamento Final dos Processos Experimentados

Para facilitar a comparação dos resultados obtidos, os dados finais são sumariados na Tabela VIII.



Neste julgamento, os cinco processos mais eficientes colocaram-se na seguinte ordem:

- 1.<sup>o</sup> *Máquina Werneck* em canal de trado, 200 gramas da mistura de arsênico branco e enxofre (1 : 3) por canal (87,6 pontos).
- 2.<sup>o</sup> Bissulfureto de carbono por *via líquida* em canal de trado, 250 cc. por canal (85,1 pontos).
- 3.<sup>o</sup> Bissulfureto de carbono por *via direta* em canal natural, 250 cc. do formicida e 10 litros de água por canal (82,6 pontos).
- 4.<sup>o</sup> *Máquina Agridefesa* em canal de trado, 10 minutos de gaseificação de bissulfureto de carbono por canal (82,1 pontos)
- 5.<sup>o</sup> *Máquina Taxa* com formicida São Thomé em canal natural, 5 minutos por canal (80,7 pontos).

Os cinco processos acima enumerados foram 100% eficientes, sendo que a pequena diferença existente entre eles em relação ao número de pontos finais, é devida principalmente á economia dos tratamentos. Os quatro processos restantes se colocaram da seguinte maneira:

- 6.<sup>o</sup> *Máquina Werneck* em canal de trado, 200 gramas de *enxofre* por canal (79,6 pontos).
- 7.<sup>o</sup> *Máquina Agridefesa* em canal natural, 10 minutos de gaseificação de bissulfureto de carbono por canal (72,5 pontos).
- 8.<sup>o</sup> *Máquina Werneck* em canal natural, 200 gramas da mistura de arsênico branco e enxofre (1 : 3) por canal (67,0 pontos)
- 9.<sup>o</sup> *Máquina Taxa* com formicida São Thomé em canal artificial, 5 minutos por canal (66,0 pontos).

Todos os processos acima citados são influenciados por fatores que limitam o seu uso sob certas condições especiais. Todos os tratamentos que empregam o trado são impraticáveis em terreno pedregoso ou em plena mata, cujo solo se apresenta densamente percorrido pelas raízes grossas das árvores. Nestes casos, torna-se impossível ou fazer qualquer furo, ou construir os canais nos pontos do saúveiro, onde seria mais eficiente a aplicação do formicida.

Os processos que utilizam o canal natural são, em regra geral, um pouco menos eficientes do que os que aplicam o inseticida em canal de trado. Esta diferença é atribuída ao reduzido grau de penetração do formicida em canal natural, devido á maior superfície das paredes em relação ao espaço para a passagem do gás. A tendência para absorção, condensação e sublimação é aumentada, e, em certos casos, o gás é incapaz de penetrar até as panelas mais profundas, devido á sinuosidade dos canais. Esta diferença em eficiencia foi apreciavelmente notavel no caso dos tratamentos por in-

suflação, com o emprego da Máquina Werneck com uma mistura de arsênico branco e enxofre. No caso do bissulfureto de carbono gaseificado pela Máquina Agridefesa, também houve uma falha, aparentemente produzida pela distribuição incompleta dos gases, quando aplicados em canal natural.

O processo da Máquina Taxa com formicida São Tomé em canal natural, é limitado devido principalmente ao custo relativamente alto para o tratamento de um formigueiro (aproximadamente 11\$000). Sob as condições destas experiências, os tratamentos com esta máquina, em canal natural, foram 100% eficientes e bastante convenientes. Outra vantagem é que a eficiência deste processo não é reduzida quando usado em dias pouco chuvosos ou frios.

Aparentemente, não há vantagem em se empregar esta máquina em canal artificial, sendo que a aplicação em canal natural apresenta a mesma, ou talvez maior eficiência. É evidente que esta máquina produz uma boa e completa distribuição dos gases, quando usada em canal natural, distribuição esta que aparentemente não é melhorada pelo processo auxiliar do trado.

Em formigueiros de mais do que 110 cms. de profundidade (classe que inclui a maioria dos saueiros prejudiciais), o tratamento com a Máquina Werneck, usando arsênico branco e enxofre em *canal natural* não é satisfatório. Este processo não é eficiente em canal natural devido à impossibilidade de se conseguir uma boa distribuição dos gases. É um tipo de tratamento barato, mas se profere o processo auxiliar do trado para se aumentar a eficiência.

A Máquina Werneck, insuflando uma carga de 200 gramas duma mistura de arsênico branco e enxofre (1 : 3) em *canal de trado*, por outro lado, é um processo que é limitado quasi somente nos casos em que as condições do solo não permitam o uso de canal artificial. Verifica-se que este processo é mais eficiente quando usado em dia de sol quente. Segundo os resultados destas experiências, este processo demonstrou ser não só 100% eficiente, como também um dos mais baratos.

O emprego do enxofre puro na Máquina Werneck, apesar de ser o mais barato de todos, é limitado, não só por ser menos eficiente como por ser aplicável somente em canal de trado. O enxofre tem ação maior como fungicida do que inseticida, de maneira que a aplicação deste processo,

logo antes da época de enxameagem, geralmente não previne a saída das formas aladas.

A Máquina Agridefesa, com bissulfureto de carbono puro, aparentemente é menos eficiente em canal natural do que em canal artificial. Além das limitações acima citadas para os tratamentos que empregam o trado, o tratamento com esta máquina tem a desvantagem de ser bastante trabalhoso, exigindo, por formigueiro, 70 minutos de trabalho difícil numa posição bastante incômoda. O processo, entretanto, é do custo médio e é bem eficiente, quando usado em dia quente, sem chuva.

A extinção da sauva, pela aplicação do bissulfureto de carbono por via líquida, tem as vantagens de ser muito eficiente, relativamente rápida, de custo médio e de não precisar de aparelhos especiais. No processo por canal natural, nenhum aparelho além duma enxada é usado, mas cita-se a desvantagem, às vezes considerável, da necessidade de se aplicar 10 litros de água por canal. No tratamento em canal artificial, necessita-se dum trado, mas não se usa água. Este último método sofre as mesmas limitações com respeito ao tipo de solo, as quais foram descritas para todos os processos que utilizam furos artificiais. Menciona-se, também, que a aplicação do bissulfureto de carbono por via líquida, geralmente não é eficiente quando feita em dias frios.

### Sugestões para o Combate á Sauva

Baseados nos resultados desta primeira parte do programa de experiencias sobre os métodos de extinção da formiga sauva, podemos fazer, apenas, algumas sugestões para o combate mais eficiente, economico e conveniente a esta prag.a.

1) Procurar e atacar os formigueiros quando ainda novos, pequenos, relativamente mais fracos e menos prejudiciais. As içãs, no inicio da fundação de novas colônias, podem ser retiradas manualmente, por meio de uma enxada.

2) Dar combate aos formigueiros logo que forem descobertos.

3) Quando possivel, extinguir os sauveiros antes dos meses de setembro e outubro, evitando assim a fundação de novas colônias pelas içãs que saíam na época de enxameagem.

4) Escolher um processo que tem demonstrado ser eficiente e que é recomendado pelos reconhecidos técnicos no assunto.

5) Na aplicação de um método, seja qual for, seguir rigorosamente as instruções do autor do processo, do inventor da máquina, da repartição pública ou do técnico que recomenda o tratamento.

6) Escolher o processo a ser usado de acordo com as condições existentes:

- a) Temperatura — fazer os tratamentos sómente nos dias quentes.
- b) Chuva — evitar atacar os formigueiros nos dias chuvosos, mas se o combate for necessário, os processos da Máquina Taxa em canal natural e da aplicação de bissulfureto de carbono puro, por via direta em canal natural, são mais eficientes sob estas condições.
- c) Solo.

(1) Quando o tipo de solo permite, utilizar os processos que empregam o trado. Dentre os métodos experimentados nesta investigação, são eficientes: a Máquina Werneck com uma mistura de arsênico branco e enxofre na proporção de 1 para 3 (200 gramas por canal); o processo da aplicação de bissulfureto de carbono por via líquida, 250 cc. por canal e a Máquina Agridefesa com bissulfureto de carbono puro (10 minutos por canal). Destes três métodos, o primeiro é mais econômico sob o ponto de vista do custo do material por formigueiro.

(2) Na impossibilidade ou impraticabilidade de se atacar o saueiro em canal natural, usando 250 cc. de bissulfureto de carbono por canal por via direta, ou a Máquina Taxa (5 minutos por canal).

7) Inspeccionar, com intervalos regulares, os saueiros atacados, afim de se verificar os resultados do combate. No caso de haver atividade de formigas após umas três semanas, deve-se proceder imediatamente a um novo tratamento.

8) Tomar todos os cuidados para que o saueiro fique extinto com o primeiro tratamento, ou falhando este, na primeira repetição. Um formigueiro velho, atacado, mudado e «amuado», torna-se muito mais difícil de se combater do que um que nunca foi atacado.

Conhecemos, naturalmente, muitos outros métodos para a extinção da sauva, entre os quais se destacam várias máquinas e diversos formicidas, bastante indicados e conhecidos como processos eficientes e econômicos. Procuramos tanto quanto possível, incluir alguns destes processos na parte da experiência atualmente em andamento. Fazemos notar que os processos usados na primeira parte não são destacados como os melhores, mas constituem métodos disponíveis às nossas mãos no momento. Certas máquinas e formicidas foram oferecidos pelos inventores e vendedores para fins experimentais, enquanto outros constam de processos mais antigos, os quais têm sido por nós utilizados durante muito tempo.

Agradecemos ao Sr. Sebastião Souza Lima, Técnico Agrícola, encarregado da Seção de Entomologia do Departamento de Biologia, os valiosos serviços prestados durante o período destas investigações, bem como as suas sugestões baseadas nos 7 anos de prática em que vem realizando o programa da extinção da sauva nesta região.

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The American genus *Paracantha* Coquillett (Diptera, Trypetidae)

by J. R. Malloch

(With 10 figures)

A careful examination of the species of the genus *Paracantha* Coquillett, and a comparison of its species with those of Schistopterinae available to me lead me to infer that the American genus is possibly referable to the latter rather than to Districhini, a tribe of Tephritinae, but its exact status as to subfamily is not important at this time as no revision of the family is intended for the Americas.

## Characters of the Tribe

The bristling of the frons is distinctive, the supraorbitals being situated between the infraorbitals and the central line of the frons, not, as usual in the family, in an almost longitudinal line with them, with the lower supraorbital above the level of the upper infraorbital. The lower infraorbital in Schistopterinae and in the present genus is usually close to the outer third of the frons and in line with or distinctly below the level of the base of the upper infraorbital. The postocular cilia or setulae are mixed white and black or all white and somewhat scale-like. The two pairs of dorso-centrals are strong, the anterior pair situated close to the suture; the scutellum has four marginal bristles, and four or more erect flattened white discal bristles. The wing has a notch or is distinctly cleft in the costa at the apex of the subcostal vein, and has a pair of quite long black bristles at the apex of the section of the costal vein basad of the notch. All known species of *Paracantha* have the dark markings on the wings ray-like in the margin.

The genera *Ditricha* Rondani and *Neoeta* Robineau Desvoidy (= *Carphotrichia* Loew) are less closely related to *Paracantha* than to the other members of their tribe.

### *Paracantha* Coquillett

1899. Journ. N. Y. Ent. Soc., vol. 7, p. 264. Genotype, *Trypeta culta* Wiedemann.  
 1923. Phillips, Journ. N. Y. Ent. Soc., vol. 31, p. 141.  
 1933. Malloch, Dipt. Patag. S. Chile, Pt. 6, Fasc. 1, Acalypttrata, p. 270.  
 1934. Benjamin, U. S. Dept. Agric., Tech. Bull. No. 401, p. 29

There are several apparently undescribed species of this genus in the collection of the United States National Museum and I give below a key for the identification of all the species known to Science.

It falls to be noted that in Benjamin's description of the genus in the paper above listed he erred in stating that the third vein is bare. He states that the stalk of the second and third veins has one or two bristles, but this is not the case, all the bristles that I have seen on the upperside being at or beyond the fork so that they are actually on the third vein. In addition to this there are two species in my present materials that have the bristles or setulae extending well beyond the inner cross vein, and in all cases there are short setulae on the underside of the third vein to or almost to the inner cross vein.

### Key to the Species

1. A large subtriangular velvety black mark on each side at anterior angle of frons between antenna and eye, the upper extremity of it close to second orbital bristle, the lower opposite apex of the second antennal segment; no black spot as a rule in centre of lower edge of face; lateral angles of the epistome, laterad of the black mark, with many short fine hairs, mainly dark in color; apex of the wing as Figure 1; third wing vein frequently bare above; fore femur with but one black spot on the posterior surface, near to apex . . . . . *culta* (Wiedemann)
  - A much smaller black dot or round spot between each antennal base and eye; lateral armature of epistome variable, generally stronger than in *culta*; apex of wing differently marked . . . . . 2
  2. Apex of the first posterior cell of the wing hyaline, the slender dark brown lines on each side of the large subtriangular hyaline mark terminating on the tips of the third and fourth veins, and only two hyaline marks on the costa between the apices of second and third veins, the lower one sometimes with a very faint greyish central wedge-shaped cloud (Fig. 2); third wing vein usually with some weak short hairs above at extreme base; fore femur with one black posterior spot close to apex . . . *cultaris* Coquillett
- xamearam depois do tratamento, ao serem abertos mais tarde

- Apex of the first posterior cell of the wing partly hyaline, the brown line on the anterior margin of the triangular hyaline mark ending in the third vein, the one on the posterior margin entering the wing margin distinctly in front of the apex of the fourth vein, and at least three hyaline marks in the costa between the apices of second and third veins . . . . . 3
- 3. Third wing vein strongly and quite closely setulose on the upperside to well beyond the inner cross vein; fore femur with two distinct black spots on the posterior surface, one near base, the other near apex . . . . . 4
- Third wing vein with at most a few setulose hairs at extreme base on upperside, rarely with a few widely separated that may extend to a point well short of inner cross vein . . . . . 5
- 4. Apex of first posterior cell of the wing marked as in Figure 5, only one or two small hyaline dots in the field of the second posterior cell besides the five slightly wedge-shaped marginal hyaline marks . . . . . *australis* Malloch
- Apex of wing as Figure 4, about ten small hyaline dots in the field of the second posterior cell besides the five slightly wedge-shaped hyaline marginal marks . . . . . *multipuncta*, n. sp.
- 5. Apex of the first posterior cell of the wing marked almost as in *culta*, with a faint central dark wedge-shaped cloud in the large conical or subtriangular hyaline mark; fore femur with but one black spot on the posterior surface, near apex . . . . . 7
- Apex of the first posterior cell of the wing differently marked, with the central dark wedge-shaped mark as distinct or almost as the sides of the triangle . . . . . 6
- 6. Fore femur with a conspicuous black preapical spot and a very faint brownish one near base on the posterior surface; apex of first posterior cell of the wing almost as in *multipuncta* (Fig. 6); a group of about 20 stiff black hairs on the gena (Fig. 7); third wing vein bare at base above . . . . . *genalis*, n. sp.
- Fore femur with conspicuous preapical and sub-basal black spots on the posterior surface; apex of first posterior cell of the wing not marked as in *multipuncta*, the hyaline marks longer, the central hyaline triangle almost invariably connecting with the lateral dark margin (Fig. 3); gena not exceptionally haired; third wing vein usually with one or more short hairs at base above . . . . . *forficula* Benjamin
- 7. The hyaline triangle in apex of the first posterior cell of the wing not extending over two-fifths of the distance to outer cross vein, and nearly as wide at its apex as its length (Fig. 9) . . . *mimetica*, n. sp.
- The hyaline triangle in the apex of the first posterior cell of the wing extending more nearly midway to outer cross vein, and not nearly as wide at its apex as its length . . . . . 8
- 8. The faint dark mark in the centre of the apical triangle in the first posterior cell of the wing wedge-shaped, not connected with the dark brown marginal edge of the triangle (Fig. 8) . . . . . *mimetica elongata*, n. var.

- The faint dark mark in the centre of the apical hyaline triangle in the first posterior cell of the wing connecting with the dark brown edge of the triangle on its lower side (Fig. 10) . . . .  
*mexicana*, n. sp.

*Paracantha culta* (Wiedemann)

- 1830, Auss. zweifl. Ins., vol. 2, p. 486, as *Trypeta culta*. Corrected to *culta* in Index, p. 480.  
 1843, *Acinia fimbriata* Macquart, pt. 3, p. 385, pl. 31, fig. 5.  
 1873, *Trypeta culta* Loew, Mon. N. Amer. Dipt., vol. 3, p. 276, 336, pl. 11, fig. 3.  
 1894, *Carphotracha culta* Snow, Kansas Univ. Quart., vol. 2, p. 169.  
 1897, *Carphotracha culta* Doane, Journ. N. Y. Ent. Soc., vol. 7, p. 185.  
 1899, *Paracantha culta* Coquillett, Journ. N. Y. Ent. Soc., vol. 7, p. 264.  
 1923, *Paracantha culta* Phillips, Journ. N. Y. Ent. Soc., vol. 31, p. 142.  
 1933, *Paracantha culta* Malloch, Dipt. Patag. S. Chile, Pt. 6, Fasc. 1, p. 270.

It appears quite probable that we are in error in accepting as this species the one segregated as such in the above key. Loew's figure 29 in his 1862 paper appears to represent the wing of *cultaris*, and his figure 3 in the 1873 paper that of the species now called *culta*. The former figure was, ac-

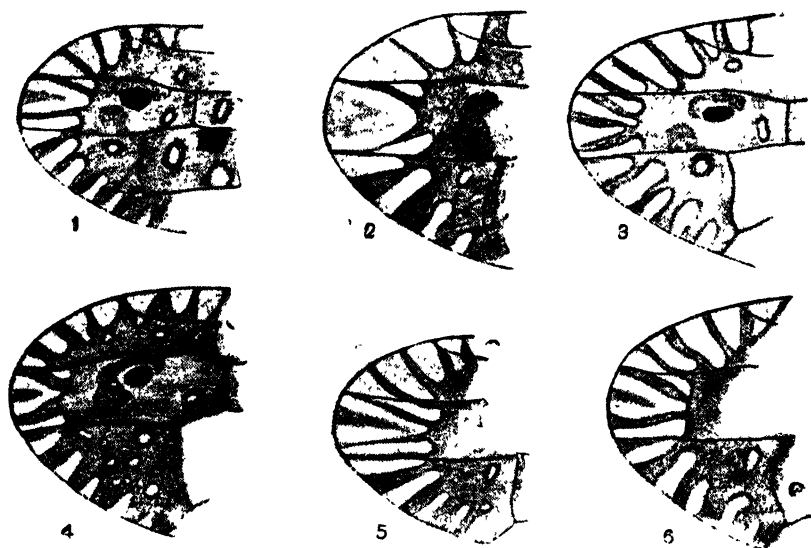


Fig. 1. *Paracantha culta*, apex of wing. — Fig. 2. *P. cultaris*, apex of wing. — Fig. 3. *P. forclicula*, apex of wing. — Fig. 4. *P. multipuncta*, apex of wing. — Fig. 5. *P. australis*, apex of wing. — Fig. 6. *P. genata*, apex of wing.

cording to Loew's statement (p. 58) made several years before his paper was written, and no doubt from Wiedemann's type-specimen as he gives only Savanna as the locality for the species which agrees with Wiedemann's record. In 1873 he adds Carolina (Macquart) and Texas



(Belfrage). The Carolina locality is apparently included because he considered *Acinia fimbriata* Macquart as a synonym of *culta*, which is correct. Only an examination of Wiedemann's type-specimen, if it is in existence, will settle the matter of the correct identification of *culta*. If as I suspect the latter is really *cultaris* then the correct name for the present species will be *fimbriata*, and *culta* will supplant *cultaris*.

One point in connection with Wiedemann's description that throws added doubt on the present acceptance of his species is his reference to the black mark between the antennal base and eye as a dot.

Doane in 1899, in the paper referred to above, states that this species may be easily separated into three groups. The first he considers as undoubtedly *culta*, «differing in no respect from Loew's figure and description». I assume that he refers to Loew's 1873 figure. The second group he would unhesitatingly identify as *cultaris*, except that he found intermediate forms. The third group contained specimens «slightly larger and darker than typical *culta*, but with three brown rays between the apices of second and third veins, and a triangular spot between the apices of third and fourth veins, the base of the triangle resting on the margin of the wing». As he found intergradations he considered they might be «distinct varieties, but certainly not distinct species».

I deal with the third group he refers to under *porpicula* in this paper.

The large subtriangular deep black mark on the anterior margin of the frons between each antenna and eye is not variable in my whole series. The apex of the wing is shown in Figure 1.

Localities: Texas, South Dakota, Kansas, Delaware, Maryland, North Carolina, Georgia, Florida, and Louisiana.

Larvae feed in bases of flower heads of various species of thistles of the genus *Cirsium*.

### *Paracantha cultaris* Coquillett

1862. *Trypeta culta* Loew, Mon. N. Amer. Dipt., vol. 1, p. 58, 94, pl. 2, fig. 19.  
 1894. *Paracantha cultaris* Coquillett, Can. Ent., vol. 26, p. 72.  
 1900. *Carphotricha culta* van der Wulp, Biol. Centr. Amer., vol. 2, p. 422, pl. 12, fig. 30.  
 1914. *Paracantha cultaris* Hendel, Abh. Berl. Kong. Zool. Anthr. — Ethnogr. Mus. Dresden, vol. 14, p. 50.  
 1933. *Paracantha cultaris* Malloch, Dipt. Patag. S. Chile, Part. 6, Fasc. 1, p. 270.

This species as a general rule is slightly smaller than the preceding one and is readily distinguished from it by the markings of the apex of the wing, there being but two hyaline wedge-shaped marks on the margin between the apices of second and third veins, and the larger similarly shaped hyaline mark in the apex of the first posterior cell extending entirely across the cell at its tip, the brown marginal rays falling on the extreme apices of the veins (Fig. 2).

As stated under the preceding species in this paper I believe this may be the true *culta*, but have seen no eastern specimens and Wiedemann's type-specimen was recorded from Savanna.

Coquillett described *cultaris* from Californian specimens and I have examined the type material in the U. S. National Museum. I have also seen specimens from California, New Mexico, Idaho, Washington, Texas, Arizona, Mexico, Guatemala, and Costa Rica.

### *Paracantha forficula* Benjamin

1923, *Paracantha culta* Phillips, Journ. N. Y. Ent. Soc., vol. 31, pl. 19, fig. 42,  
1934, *Paracantha forficula* Benjamin, Bull. No. 401, U. S. Dept. Agric., p. 31,  
fig. 23.

The adult of this species was described from a long series of specimens of both sexes all reared from *Borrchia frutescens*, and various figures of the different stages were given under Figure 23 by Benjamin.

The «types» are given as 100 adult specimens about equally divided as to sex, with the holotype male and allotype female selected from Cocoa Beach, Florida.

As neither holotype nor allotype were labelled by Benjamin, nor in fact was the species name on the labels in his collection, I am compelled to select a pair in accord with the data given by the describer though there are a number of other specimens from the same locality in the collection. It may be pertinent to note here that there are now but 98 specimens in the collection.

The describer emphasised the shape of the black mark on the extremity of each frontal orbit and the apical wing markings (Fig. 3) as characters for distinguishing his species from *culta*, but failed to note the presence of two deep black spots on the posterior surface of the fore femur instead of but one as in *culta*.

There is no doubt in my mind that Phillips figured the wing of this species as that of *culta* as noted in the reference given above, though she does not include Florida in her list of localities for that species. Florida is the only definite locality for *forficula*. Type in U. S. National Museum, Type Cat. No. 54351.

In connection with the present species I may present some data regarding the type of hairing of the upperside of the first wing vein.

In all species of the genus this vein is haired or setulose from the base of the node to the rectangular preapical bend except on a short interval directly below the point where the subcostal vein should bend forward. In all the species but two the setulae are very closely placed and fine, slightly increasing in strength from base to the breach, and on the apical section a little stronger, with usually one or two noticeably stronger short bristles at apex of the series. But in *forficula* and *multipuncta* there are departures from this rule. In the first named the setulae are longer and more widely spaced, yellowish brown in color, with from one to three a little before the interval much longer, slightly lanceolate, and deep black, those beyond the breach being also longer and more widely spaced than usual. In *multipuncta* the setulae are uniformly longer and more widely spaced than in *culta*, and mixed black and whitish yellow in color.

In *forficula* the chitinous apical portion of the ovipositor of the female is much longer in comparison with its length than in *culta*, but this character can be seen only when the ovipositor is fully extended.

*Paracantha multipuncta*, n. sp.

Female. — Of the same general testaceous yellow color as the other species, but there is a large blackish brown spot behind the base of the second bristle in each infraorbital series on the frons, and a smaller one in centre of frons between the two anterior bristles of the supraorbital series, and the wings have a much larger number of minute hyaline dots in all the cells.

A black dot between each antennal base and eye, a large one in centre of the lunule, the usual velvety black spot in upper centre of face about as large as the glossy black one on each side of the epistome, the central epistomal one minute.

Some black hairs behind the large lateral epistomal spot. The black mark near centre of postocular orbit distinct. Third antennal segment more sharply angled above at apex than usual, and more tapered to apex than in *culta*.

Mesonotum with the usual five longitudinal series of bare brown patches, a fuscous mark in front of suture on

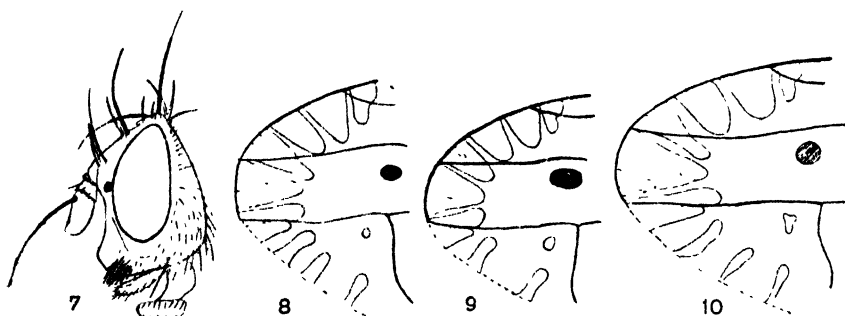


Fig. 7. *Paraeantha genalis*, head in profile. — Fig. 8. *P. mimetica elongata*, apex of wing, diagrammatic — Fig. 9. *P. minetica*, apex of wing, diagrammatic. — Fig. 10. *P. meriouna*, apex of wing, diagrammatic.

each side near the base of the posterior notopleural bristles; the four marginal bristles on the scutellum in brownish dots, two curved lines extending forward from the posterior pair. Scutellum with four long erect white discal bristles.

Legs testaceous yellow, fore femur with two posterior black spots and one on the anterior surface opposite the preapical one, the other femora each with two black spots, one near base, the other near apex, that extend across the ventral surface and slightly upward on to the anterior and posterior surfaces.

Wing brown, with short wedge-shaped marginal and many minute dots, and some larger spots in the cells, hyaline, the brown color darker along the edges of most of the costal wedge-shaped and some of the discal hyaline marks. The usual deep black bulla present in the first posterior cell, the area between it and the third vein reddish brown, the vein above it much arched, the setulae extending on upperside of third vein from base to beyond the preapical arch. Apex of wing as in Figure 4, about six hyaline marks along the outer edge of the third posterior cell. Setulae on underside of third vein extending to the inner cross vein.

Abdomen ovate, with some dark marks on bases of the tergites. Sixth tergum with most of the disc covered with

short black decumbent hairs that are much denser than on the other tergites.

Length, 6.5 mm.

Type, Peru (Parish).

In United States National Museum, Type Cat. No 54347.

*Paracantha australis* Malloch

1933, *Paracantha australis* Malloch, Dipt. Patag. S. Chile, Pt. 6, Fasc. 1, p. 271, pl. 3, fig. 13.

This species agrees with *multipuncta* in having the setulae on the upperside of the third wing vein extending well beyond the inner cross vein, and two distinct black spots on the posterior surface of the fore femur. The markings of the apex of the wing are quite different however (Fig. 5), and the species is also smaller and paler colored.

Argentina; Uruguay.

Type male in British Museum of Natural History, allotype in United States National Museum, Type Cat. No. 54353.

*Paracantha genalis*, n. sp.

Male. -- This species agrees with *culta* in most respects, having but one black spot on the posterior surface of the fore femur, the third vein bare at base above, and the third antennal segment not much tapered apically and only moderately angulate at tip.

It differs from that species in having a small round black spot between each antennal base and eye, the vibrissal angle dark brown and glossy, with no definite black spot in the type-specimen, and a group of stiff black bristles (Fig. 7). The postvertical pair of bristles are a little longer than the pair of slightly incurved bristles laterad of them about midway to the inner vertical pair, and the markings of the wing at apex are as Figure 6.

Length, 6.5 mm.

Type, Halfmoon Bay, California, *Cirsium edule* (W. H. Lange).

In United States National Museum, Type Cat. No. 54348.

There is no indication on the label whether or not the specimen was reared from larvae feeding in any part of the plant named.

*Paracantha mimetica*, n. sp.

Male and Female. — Very similar to *culta*, but with only a small round black spot between each antennal base and eye, and the hyaline subtriangular mark in the apex of the first posterior cell of the wing short, almost as wide at apex as its length and not extending forward more than two-fifths of the distance to the outer cross vein (Fig. 9).

Length, 6-6.5 mm.

Type male, allotype, and two female paratypes, Alsea Mt., Oregon, 1000 ft. (H. A. Scullen).

Paratypes: Halfmoon Bay, California, *Cirsium edule* (W. H. Lange); Woodside, Cal. (Aldrich); Claremont, Cal. (Baker); San Jacinto Mts., Cal. (Grinnell); West Cliff, Col., on thistle; and San Juan Is., Wash. (Aldrich). U. S. N. M. Type Cat. No. 54349.

*Paracantha mimetica elongata*, n. var.

Similar to the typical form except in having the hyaline triangular mark in the apex of the first posterior cell longer and narrower (Fig. 8).

Length, 6-6.5 mm.

Type male, allotype, and one female paratype, Koebler, N. M. (W. R. Walton).

Paratypes: 15 1/2 miles west of Artesia, N. M.; Jamez Mts., N. M., Arizona; Hidalgo, Texas; Orizaba, Mexico.

In United States National Museum, Type Cat. No. 54350.

*Paracantha mexicana*, n. sp.

Male. — A slightly darker and larger species than *mimetica*, principally distinguished from it by the apical markings of the wing (Fig. 10), there being a faint greyish or brownish mark in the centre of the hyaline triangle in the apex of the first posterior cell that runs from the edge of the wing forward to near the anterior extremity of the triangle, connecting with the dark brown colour of the lower edge of same so as to divide the triangle faintly into a hyaline streak along the entire upper or anterior edge, and a much shorter one on the basal half of the lower edge.

There are three black spots on the lunule in the type, but these are variable in the other species, so are not intended

as a specific criterion, the other black spots are as in *mimetica*, the one in centre of the epistome absent.

Type, Guanajuato, Mexico, in flowers of *Cirsium mexicanus* (A. Duges).

In United States National Museum, Type Cat. No. 54346.

### **Importância, distribuição, hospedeiros e inimigos naturais do podador do algodoeiro *Chalcodermus bondari* Marshall (Col. Curc.)**

por Henrique F. G. Sauer, Instituto Biológico, S. Paulo

#### **Considerações sobre a importância**

A espécie descoberta por Bondar em 1925 e descrita posteriormente por Marshall (1927), segundo as informações mais recentes, não se enquadra, de um modo geral, entre as pragas de grande importância econômica para a cultura do algodão. Salvo em determinadas zonas dos Estados da Bahia (Bondar, 1928) e Pernambuco (Pyenson, 1938), e em certas regiões do Chaco (Republica Argentina) (Ogloblin, 1934) onde os danos constatados pelos diversos autores parecem mais evidentes, não se tem notícia de prejuízos impressionáveis infringidos ao algodão pelo *Chalcodermus bondari* apesar da frequência com que é encontrado em outras áreas do Brasil. Hambleton e Sauer (1938), verificando a comum ocorrência desse inseto, não relevaram a sua importância, constatando que os lavradores não lhe emprestam atenção, dispensando em absoluto quaesquer medidas de combate.

No entretanto, si nos Estados do nordeste o «podador do algodoeiro» é mais frequente e acarreta de algum modo certos danos, nos Estados centrais a sua ocorrência é mínima e, as observações realizadas até presentemente, só servem para coloca-lo em plano absolutamente secundário como praga da cultura algodoeira.

#### **Distribuição geográfica**

Os conhecimentos atuais sobre a distribuição do *C. bondari* vêm confirmar e até ultrapassar a suposição de Globlin (1934), que o considerou generalizado desde o Estado da Bahia até o Chaco argentino. Hambleton e Sauer (1938) estenderam a constatação até Paraíba e o autor, em 1940,

teve a confirmação de sua existência até o Estado do Rio Grande do Norte, não sendo demasiado supôr, em vista das condições semelhantes, que a espécie ocorra também no Ceará. Em 1938 foi, igualmente pelo autor, notificada a sua presença nos Estados do Espírito Santo e Minas Gerais e, com o intervalo aproximadamente de um ano, J. Pinto da Fonseca, em 1935 e E. J. Hambleton, em 1936, consignaram o «podador do algodoeiro» no Estado de São Paulo. Essa espécie tem, portanto, uma vasta área de distribuição que seria ainda muito ampliada si, como acredita Ogloblin (1934), *C. bondari* for idêntico a *C. niger* descrito por Hustache, de material colhido na Bolívia.

#### Plantas hospedeiras

Conquanto os hospedeiros do *C. bondari* abranjam atualmente quatro famílias botânicas, a das Malvaceae agrupa maior número de espécies conhecidas, seguida das Euphorbiaceae, aparentemente com duas espécies e por fim das Tiliaceae e Bombaceae, com uma cada uma.

Dentre as plantas da primeira família o algodão (*Gossypium* spp.) constitui o hospedeiro comum nas diversas regiões consideradas, tendo Pyenson (1938) verificado que todas as variedades são atacadas. Bondar (1929) registra como hospedeiros a «Malva branca» e «Malva preta»; Ogloblin (1934) menciona *Hibiscus esculentus*, *Althaea officinalis*, *Althaea* sp., *Malva silvestris* e *Sida* sp.; Pyenson (1939) cita duas espécies de Malvaceae, uma indeterminada e outra pertencendo ao gênero *Sida*, e *Croton grandulosus*, uma Euphorbiaceae.

Em São Paulo, depois da primeira constatação do ataque desse inseto sobre algodão, em Dezembro de 1936, numa única planta de uma cultura em São João da Boa Vista, mais dois outros algodoeiros, em Campinas, foram encontrados atacados, respectivamente em Janeiro de 1937 e Dezembro de 1938. E, excluídos esses três casos, apesar de muitas inspeções terem sido feitas, jamais foram notificados outros ataques em algodoeiros. Posteriormente, em Fevereiro de 1938, notaram-se casualmente os sintomas característicos da infestação pelo «podador do algodoeiro» nas extremidades dos ramos de uma Tiliaceae, tendo sido possível criar um adulto. Dessa data em diante voltou-se maior atenção aos hospedeiros dessa espécie. Durante Fevereiro e Março foram comumente encontradas, em Campinas, plantas com os característicos da infestação por es-



sa praga. De Abril em diante as suas manifestações vão desaparecendo gradativamente e desde fins de Maio até Outubro não se logrou verificar nenhuma manifestação em qualquer dos hospedeiros obtidos. No entanto o seu aparecimento novamente recrudece, e com bastante intensidade, em Outubro e mēzes subsequentes.

Em três anos consecutivos essa observação foi semelhante, vindo em favor da suposição de Pyenson (1939), que atribue às larvas dessa espécie, durante a estação seca, o fenômeno da diapausa.

Servem de hospedeiros ao *C. bondari*, em São Paulo, as seguintes espécies vegetais: *Sida cordifolia*, *S. rhombifolia*, *S. urens*, *S. acuta*, *Walteria americana*, *Malvastrum coromandelianum*, *Pavonia spinifex* e *Hibiscus esculentus*, além de *Cossypium* sp., todos pertencentes às Malvaceas; uma espécie de *Croton* (Euphorbiacea), plantas novas de *Chorisia speciosa* (Bombaceae) e *Triumpheta semitriloba* (Tiliaceae) são também frequentemente encontradas hospedando essa espécie.

#### Inimigos naturais

Em quasi todas as regiões onde o *C. bondari* foi presenciado, foram encontrados inimigos naturais. Na Baía, Bondar obteve das larvas do «podador do algodoeiro» o Braconídeo *Urosygalphus chalcodermi* descrito por Wilkinson (1930). No Chaco, Ogloblin (1934) criou dois parasitas externos das larvas: um Pteromalídeo indeterminado e um Eurytomídeo do gênero *Eurytoma*. Em Pernambuco, Pyenson (1939) criou também duas outras espécies de parasitas, um Braconídeo do gênero *Urosygalphus* e um Chalcidídeo indeterminado.

Em São Paulo também foram obtidas duas espécies de inimigos naturais desse curculionídeo: o Braconídeo *Heterospilus* sp., (det. por C. F. W. Muesebeck), e o Pteromalídeo *Zatropis* sp. (det. por A. B. Gahan como nova espécie, muito afim de *Z. incertus* Ashm.).

De 34 larvas colhidas em 13/3/1937, 24, ou cerca de 73%, estavam parasitadas por esses dois inimigos, notadamente pela espécie de *Zatropis*.

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### A review of the genus *Entomocrabro* (Hym. Sphecidae, Pemphilidini)

by V. S. L. Pate, Cornell University, Ithaca, New York

One of the largest, most complex and difficult, yet at the same time fascinating assemblies of the Sphecoids are the Pemphilidine wasps. Since 1775, when Fabricius first segregated the group under the name *Crabro*<sup>1</sup> (nec Geoffroy, 1762), no less than ninety generic or subgeneric names have been proposed for presumed discrete entities within the complex. Many of these are valid, a number are synonyms, while still others are poorly known or imperfectly understood. The present paper is a review of one of those falling in the last category.

In 1905, Kohl proposed the subgenus *Entomocrabro*, basing it upon a unique male specimen collected at Pará, Brazil,

<sup>1</sup> The recent ill-advised attempt of the International Commission on Zoological Nomenclature, at the Lisbon Congress in September, 1935, to conserve the name *Crabro* Fabricius, 1775 for the Sphecoid wasp, and *Cimex* Olivier, 1790 for the sawfly, by placing each on the Official List of Generic Names, was ineffectual on two scores: first, the published attempt to do so was illegal and not in conformance with the regulations of the Rules which stipulate that publication of intent to conserve or change a name must be published at least one year prior to such action; and secondly, it has since been shown by Ross [Illinois Biol. Monogr., vol., XV, n.º 2, pp. 59-60, (1937)] that the name *Clavellarius* Olivier, 1789 has priority over *Cimex* Olivier, 1790, thus automatically removing both *Crabro* and *Cimex* from the List. This situation will be discussed fully elsewhere.

and forwarded to him by Adolpho Ducke to whom the interesting new form was dedicated. Since originally proposed, *Entomocrabro* has remained practically unknown. On the basis of several new forms, described herewith, I am now able to offer a rediagnosis of, as well as comments upon, this interesting and poorly understood group. However, as indicated elsewhere<sup>2</sup>, I believe *Entomocrabro* merits recognition as a discrete genus.

### *Entomocrabro* Kohl

*Crabro* (*Entomocrabro*) Kohl, Verh. Zool.-Bot. Ges. Wien, LV, p. 356, (1905). — Kohl, Ann. K. K. Naturhist. Hofmus. Wien, XXIX, pp. 4, 10, (1915).

*Entomocrabro* Pate, Entom. News, XLVII, pp. 150, 152, (1936); (key to genera) — Pate, Mem. Amer. Ent. Soc. no 9, p. 26, (1937); (citation of genotype).

Genotype: *Crabro* (*Entomocrabro*) *Dukei* Kohl, 1905 [= *Entomocrabro Dukei* (Kohl)]. (Monobasic.)

Both sexes of *Entomocrabro* have the mandibles simple apically and a distinct pygidial area present on the ultimate abdominal tergite, thus indicating that the genus is indubitably a member of the *Lindinius* complex. In its diagnostic features, *Entomocrabro* is apparently somewhat intermediate between *Entomognathus* and the *Rhectognathus* section of *Encopognathus*, agreeing with both of these entities in having the lower mandibular margins deeply excised. From each, however, *Entomocrabro* is distinguished by the presence of hypersternauli<sup>3</sup>, as well as at times sternauli, on the mesopleura, by the antennal sockets being contiguous to each other and to the nearest eye margin, and the absence of transverse, basal «pockets»,<sup>4</sup> invaginations or folds on the abdominal tergites. In *Entomocrabro*, as in *Rhectognathus*, the anal lobe of the hind wing is subequal in length to, or shorter than, the submedian cell, and a more or less distinct psammophore is present in the females, but the abdomen of the present genus is fusiform and circular in cross section, while the eyes are quite coarsely faceted anteriorly and, under high magnification of one hundred or more

<sup>2</sup> Entom. News, XLVII, p. 150, (1936).

<sup>3</sup> Cf.: Trans. Amer. Entom. Soc., LXVI, p. 4, (1910).

<sup>4</sup> These are present in most of the various groups of Pemphiidines, and are normally more or less concealed by the overlapping, caudal margins of the preceding tergite. In many of the larger forms, mites are often found congregated there, and they may therefore be interpreted as acarid chambers.

diameters, are very finely and sparsely puberulent, in sharp contrast to the completely glabrous, more finely faceted eyes, and the cordiform, depressed abdomen of *Rhectognathus*. Moreover, the members of the present genus have well developed supraorbital foveae, and a distinct epicnemium on the prepectus, while the males possess thirteen segments in the antennae, whereas both supraorbital foveae and an epicnemium are wanting, and the males have but twelve antennal articles in *Rhectognathus*.

In 1936, I presented a key for the separation of *Entomocrabro* from the other genera of the *Lindenius* complex.<sup>5)</sup>

#### Generic Characters

Small forms. Head subquadrate in anterior aspect, transversely subrectangular to subquadrate in dorsal aspect. Eyes very finely and sparsely puberulent; much more coarsely faceted anteriorly than posteriorly; inner orbits very strongly convergent towards clypeus and antennal sockets. Malar space wanting. Ocelli large, their diameter subequal in length to the postocellar distance, situated in an equilateral triangle. Vertex, as a rule, with well developed supraorbital foveae which are oblique in position and run almost from hind ocelli forward toward upper inner orbits; bisected by a longitudinal furrow running from between hind ocelli toward occiput. Temples moderately wide above, tapering ventrad; temporal carinae absent. Antennae distinctly thirteen-segmented in males, twelve-segmented in females, situated low on face on dorsal margin of clypeus, the antennal sockets contiguous to each other and to the nearest eye margin of lower inner orbits; scape slender, cylindrical, slightly bowed, usually about two-thirds as long as vertical length of eye; pedicel subcylindrical, elongate, longer than either first or second flagellar articles; flagellum simple, elongate, without teeth or excisions. Front bisected above by an impressed furrow running forward from median ocellus to the median longitudinal impressed linear basin on concave vertical lower half. Clypeus narrow, transverse, usually with a short produced lobe medio-apically. Maxillary palpi six-segmented, labial four-segmented. Mandibles more or less falcate, the apices simple and acuminate in both

<sup>5)</sup> Entom. News, XLVII, pp. 151-153, (1936).

sexes, the inner margins notched and more or less bidentate medially, lower margins strongly notched or excised medially. A more or less distinct psammophore present in females.

Thorax with the pronotum very narrow, transverse and linear, situated more or less below the level of the more or less strongly arched mesonotum; suture between mesonotum and scutellum, or the anterior margin of the latter, distinctly foveolate. Mesopleura with a sharp epicnemium anteriorly on prepectus; episternal suture vertical or almost so from below tegulae; omauli, hypersternauli, and mesopleural pit present and well developed; sternauli present, incomplete, or absent; episternauli wanting; mesepisterna without a vertical carina or tubercle before middle coxae. Propodeum with a trigonal area basally on dorsal face, at least in females; posterior face with an elongate, linear furrow, fovea, or areole discally; dorsal and posterior faces margined at sides by distinct, well developed lateral carinae.

Fore legs with a well developed pecten on tarsi, and with many somewhat irregularly disposed ammochaetae on trochanters, femora and tibiae, the pecten and ammochaetae best developed and most noticeable in females. Females with fore tarsi slightly flattened. Middle tibiae with a distinct though rather small apical calcar in both sexes; hind tibiae with two more or less lanceolate calcaria, the outer faces furnished with a number of rather long, slender, suberect spines. Legs otherwise simple and normal.

Fore wings with marginal cell short, broadly truncate at apex and furnished there with a large trigonal appendiculate cell; the transverse cubital vein straight and inclined, joining the radial vein distinctly before the middle of the marginal cell, recurrent vein joining the cubitus distinctly before the middle and causing it to be more or less angled backward. Hind wings with the anal lobe subequal to, or shorter than, the submedian cell.

Abdomen sessile, elongate fusiform, circular in cross section; impunctate or at most finely acupunctate. Tergites without basal acarid chambers, and folded under roundly and imbricate with the convex sternites. Ultimate tergite of both sexes with a distinctly demarcated pygidial area, that of female trigonal, of male subquadrate to subtrapeziform.

## Ethology

The females of *Entomocrabro* are furnished with a psammophore. This is presumptive evidence that the members of this genus nest in dry, sandy or friable soil, and excavate burrows in a manner comparable to that of *Belomicrus*<sup>6</sup> and *Anacrabro*.<sup>7</sup> Aside from this inference, however, nothing is known concerning the biology of these tiny forms.

## Distribution

The genus *Entomocrabro* is a compact group of small forms confined, so far as is known, entirely to the Neotropical region. It ranges from the Amazonian basin in Brazil and the intermontane Andean region of central Peru as far north as the central west coast area of Guatemala. The subjoined key will serve to separate the five known forms.

## Key to the Species

1. Antennae thirteen-segmented; seven abdominal tergites visible; (males) . . . . . 2
- Antennae twelve-segmented; six abdominal tergites visible; (females) . . . . . 3
2. Front armed medially just above antennal sockets with a small, porrect, spinoid tubercle; clypeus tumid discally and produced medio-apically into a short, narrow, truncate lobe which is obscurely tridentate apically and laterad of which on each side is a single acute dentiform angle; mesonotum anteriorly on each side of middle with a large deep fovea margined anteriorly by a transverse carinule; (Pasco district, Junin, Peru) . . . . . *umahuaca*, n. sp.
- Front simple, unarmed; clypeus flat discally and produced medio-apically into a short, rather broad, edentate, truncate lobe, laterad of which on each side are two distinct teeth; mesonotum without foveae anteriorly; (Pará, Brazil) . . . . . *Dukei* (Kohl)
3. Mesonotum strongly arched and vertically declivous anteriorly, the mesonotum situated much below level of it; front armed medially with a small, porrect spinoid tubercle just above antennal sockets . . . . . 4
- Mesonotum not greatly arched, the pronotum not situated much below level of it; front simple, unarmed; (Pasco district, Junin, Peru) . . . . . *sacuya*, n. sp.
4. Mesopleura with the sternauli present for entire distance to middle coxae; frontal tubercle large and distinct; vertex more or less opaque, with fine microscopic clathrate lineation, the supraorbital foveae

<sup>6</sup>) Cf.: Williams, Pan-Pacific Entom., XII, pp. 3-6, (1936); v. et. Pate, Trans. Amer. Ent. Soc., LXVI, no. 3. (1940).

<sup>7</sup>) Cf.: Bart, Bull. Wisconsin Nat. Hist. Soc., VI, p. 147 et seq. (1908).

- distinct, oblique, lenticular; mesonotum medially with four parallel longitudinal carinules on the anterior declivous portion; (Guatemala) . . . . . *bequaerti*, n. sp.
- Mesopleura with the sternauli altogether absent; frontal tubercle small and indistinct; vertex perfulgid, nitidous, the supraorbital foveae indistinct, oblique, oval; mesonotum without carinules anteriorly; (British Guiana) . . . . . *richardsi*, n. sp.

*Entomocrabro Dukei* (Kohl)

*Crabro* (*Entomocrabro*) *Dukei* Kohl, Verh. Zool.-Bot. Ges. Wien, LV, p. 357, text-figs. 28, 29, (1905); (male; Pará, Brazil).  
*Entomocrabro Dukei* Pate, Mem. Amer. Ent. Soc., no. 9, p. 26, (1937).

Type. — ♂; Pará, Brazil. September 27, 1901. (Adolpho Ducke?) [Natural History Museum, Vienna.]

The absence of a frontal spine or tubercle, the truncate distal margin of the median clypeal lobe with two lateral teeth distinguish *Dukei* from the following new Peruvian form, *amahuaca*. The present species is apparently still known only from the unique male taken in the Amazonian delta region.

*Entomocrabro sacuya*<sup>8</sup>, n. sp.

*Entomocrabro* sp., Pate, Entom. News, XLVII, p. 153, (1936); (female; Rio Pachiten district, Peru).

The present species displays certain features characteristic of *richardsi* and *bequaerti*, but the simple non-tuberculate front and the unarched mesonotum differentiate *sacuya* from both of those forms. In the incomplete sternauli and the two anterior mesonotal impressions, *sacuya* agrees with *richardsi*, and with *bequaerti* in the structure of the pronotum, the distinct, oblique supraorbital foveae, and the generally opaque habitus; but in the latter form the supraorbital foveae are relatively short and ovate, whereas in *sacuya* they are elongate and linear.

Type. — ♀; Puerto Bermudez on the Rio Pichis, Provincia de Pasco, Departamento de Junin, Peru, July 12-19, 1920. (J. C. Bradley and W. T. M. Forbes.) [Cornell University.]

Female. — 4 mm. long. Black; the following stramineous: palpi, mandibles except the rufous apices, scape, pronotal tubercles, femora at apex, fore and middle tibiae and all tarsi entirely, and hind tibiae on outer surface. The following castaneous: clypeal disc, fore and middle coxae, trochanters and femora, hind tibiae on inner face, abdominal sternites, and last abdominal segment wholly. Pedicel, flagellum, and hind femora, brunneous. Tegulae and axillary sclerites, light

<sup>8</sup>) After the Sacuya Indians of east central Peru.

fulvous. Wings clear hyaline, iridescent; veins and stigma brunneous.

Head subfulgid; clypeus, except disc, and lower inner orbits with appressed silvery pile; occiput and temples more sparsely clothed with puberulent silvery pubescence. Front and vertex with a microscopically fine reticulate lineation, superposed on which are a few scattered fine setigerous acupunctures each bearing a short suberect setula; upper half of front bisected by a shallow furrow running ventrad from median ocellus and ending on lower half in a shallow, indistinct, opaque, vertical linear-lanceolate impression, without a spine or tubercle medially just above antennal sockets. Ocelli arranged in an equilateral triangle, the postocellar distance two-thirds the length of the ocellocular line; diameter of ocelli subequal in length to postocellar distance; ocellar area bisected by a short longitudinal furrow running between the hind ocelli; supraorbital foveae oblique, elongate, linear, opaque. Temples fulgid, with fine setigerous acupunctures; temporal carinae absent; temporal ammochaetae present; occipital carina present but not reaching mid-gular line. Antennae reaching about to tubercles; scape slender, subcylindrical, two-thirds the vertical length of eye; pedicel subcylindrical, one and two-thirds the length of first flagellar article; flagellum finely puberulent, simple, first and second segments subequal in length. Clypeus narrow, transverse, median length almost one-third (.277) the vertical length of eye, flat laterally, weakly elevated discally into a flat subtrigonal, glabrous, nitidous platform terminating in a short produced truncate lobe the apical width of which is about two-third the median clypeal length and laterad of which on each side are two small acute teeth. Mandibles falcate, apices acuminate, inner margins acutely notched medially, lower margins deeply excised medially and provided with rather long ammochaetae.

Thorax more or less fulgid; dorsum clothed with inconspicuous, decumbent, light aeneous pubescence; mesonotum anteriolaterally on each side just above pronotal tubercles, prepectus and mesosternum with conspicuous, appressed silvery pile. Pronotum narrow, transverse, linear, situated slightly below the level of the very lightly arched mesonotum; with fine acupuncturation; anterior dorsal margin edged with a transverse carinule except medially where it is broadly rounded and broadly and shallowly notched, dorsal surface finely foveo-



late behind transverse carinule. Mesonotum lightly arched, with fine microscopic reticulate lineation superposed on which is a series of fine, moderately close, setigerous punctures, anterior fourth with a pair of widely separated, parallel, longitudinal, nitidous welts, each ending in a short, obscurely foveolate, lenticular fovea; scutellum flatly tumid, anterior margin with a transverse series of five large foveae, caudal margin finely foveolate; postscutellum simple, hind margin minutely foveolate. Mesopleura anteriorly with a strong epinemium; prepectus and below hypersternauli with fine acupunctures, remainder of surface with microscopically fine reticulate lineation superposed on which is a series of scattered, fine, setigerous acupunctures; sternauli present for only a very short distance anteriorly; omauli, episternal suture, and hypersternauli foveolate; episternal pit distinct; caudal margin minutely foveolate. Metapleura glabrous, perfulgid, with obscure, fine microscopic clathrate lineation, hind margin with a series of coarse foveolae. Propodeum glabrous, fulgid; dorsal face with a trigonal area, the basal and lateral margins of which are indicated by a row of large, irregularly quadrate areoles, and bisected by a shallow trough margined laterally by a carinule, surface nitidous within areoles, remainder obscurely and microscopically subfavose, the lateral areas traversed by irregular, oblique, subparallel carinules; posterior face discally with a broad deep cuneate fovea margined below and above but not laterally and subnitidous within, the lateral areas traversed by a few subhorizontal rugulae basally, microscopically and obscurely subfavose above; lateral carinae well developed, shortly forked below; lateral faces microscopically and obscurely subfavose, the dorsal and caudal margins furnished with a few oblique rugulae.

Fore legs with ammochaetae on trochanters, femora and tibiae; the tarsi with a distinct pecten. Middle tibiae with a few, hind tibiae with a number, of slender, elongate, suberect, testaceous spines on outer face.

Abdomen more or less fulgid; first tergite and all sternites nitidous, remaining tergites, except last, clothed with short, inconspicuous, decumbent, puberulent silvery pubescence, and with fine microscopic, transverse reticulate lineation. Ultimate tergite with a broad equilaterally triangular pygidial area, the disc perfulgid and furnished with a few well separat-

ed, rather coarse, setigerous punctures, each bearing a rather long, fine, decumbent light setula.

Male. — Unknown.

Paratype. — 1 ♀; Topotypical. Same data as type.

The paratypic specimen agrees with the type in all essential features of livery and structure.

*Entomocrabro amahuaca*<sup>9</sup>, n. sp.

The present species occupies a position somewhat intermediate between the preceding and following two forms. In common with *sacuya* and presumably *Dukei* also, the mesonotum is very light arched with the pronotum situated but slightly below the level of it; but *amahuaca* differs markedly from those two species in the tuberculate front, agreeing in this respect with *bequaerti* and *richardsi* which, however, unlike *Dukei*, *sacuya* and *amahuaca*, have the mesonotum very strongly arched and vertically declivous anteriorly with the pronotum situated much below the level of it. The apparently tridentate clypeal lobe with but one dentiform angle laterally on each side, the indistinct, obsolescent supra-orbital foveae, the deep, anteriorly margined mesonotal foveae, and the curious and distinctive structure of the scutellum distinguish *amahuaca* from all the other known forms of the genus.

Type. — ♂; Puerto Bermudez on the Rio Pichis, Provincia de Pasco, Departamento de Junin, Peru. July 12-19, 1920. (J. C. Bradley and W. T. M. Forbes.) [Cornell University.]

Male. — 4 mm. long. Black; the following stramineous: palpi, mandibles except rufous apices, pronotal tubercles, fore, middle and hind femora at apices, fore and middle trochanters, tibiae and tarsi entirely, and basal third of hind tibiae. The following castaneous: scapes and pedicel, fore and middle femora, and hind tibiae and tarsi. Tegulae and axillary sclerites, light fulvous. Wings clear hyaline, iridescent; veins and stigma deep castaneous.

Head fulgid; clypeus, except disc, with appressed silvery pile; temples and occiput rather shaggily but thinly clothed with long decumbent silvery pubescence. Vertex and upper half of front glabrous and nitidous except for a sparse and scattered series of fine, setigerous acupunctures each of which bears a long erect setula; front on upper half bisected by a deep furrow running ventrad from median ocellus to opaque concave lower half and ending there in dorsal margin of an

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<sup>9</sup>) After the Amahuacas, an Indian tribe of east central Peru.

indistinct median elongate sublinear impression, just above antennal bases with a distinct porrect spinoid tubercle medially. Ocelli arranged in an equilateral triangle, the postocellar line two-thirds the length of the ocellocular distance, diameter of ocelli subequal in length to postocellar distance; ocellar area bisected by a furrow running from between hind ocelli to occiput; supraorbital foveae indistinct, obsolescent, opaque, oblique, linear-ovate. Temples perfulgid; temporal carinae and ammochaetae absent; occipital carina present, well developed, but not reaching mid-gular line. Antennae reaching about the tubercles; scapes slender, cylindrical, elongate, seven-tenths the vertical length of eye; pedicel subcylindrical, one and one-third the length of first flagellar article; flagellum finely puberulent, slender, simple, without excisions or modifications of any sort, first two segments subequal in length. Clypeus narrow, transverse, median length three-tenths vertical length of eye, flat laterally, elevated discally into a low, flat, narrow, glabrous and nitidous, subcampanulate platform which ends distally in a short produced lobe, the apical width of which is three-fifths the median clypeal length, and the distal margin of which is weakly tridentate, mediolaterad on each side of lobe apical margin with an acute dentiform angle. Mandibles slender, falcate, apices acuminate, lower margins deeply excised and provided with ammochaetae.

Thorax generally perfulgid. Pronotum almost on a level with the normally arched mesonotum; sparsely clothed with fine decumbent silvery pubescence; anterior dorsal face broadly rounded medially, but briefly, transversely carinate laterally, the humeral angles acute, subdentate, dorsal surface foveolate behind transverse, lateral carinae, and laterally with a number of longitudinal carinulae which are slightly divergent cephalad. Mesonotum, scutellum and postscutellum glabrous and nitidous save for a scattered series of fine setigerous acupunctures each of which bears a long, erect, light setula; mesonotum anteriorly on each side of middle with a large subovate fovea margined anteriorly by a short transverse carinule; scutellum distinctly tumid discally, anterior and posterior margins foveolate, anterior third with a large, deep, transverse, bicrescentic trough; postscutellum simple, flat, hind margin finely foveolate. Mesopleura glabrous and nitidous except for prepectus which bears a few scattered fine setigerous acupunctures, each

bearing a long, suberect silvery hair; anteriorly with a sharp epicnemium; sternauli present for more than half the distance to, but not reaching the middle coxae; omauli, episternal suture, and hypersternauli foveolate; mesopleural pit present. Metapleura glabrous, nitidous, posterior margin with a series of coarse foveolae. Propodeum glabrous, perfulgid; dorsal face with a number of large and irregular areoles: medially at base with an elongate subovate areole, laterad of which on each side is a large subtrigonal one bearing two very small subquadrate areoles upon its blunted apex, laterad of this series with a large, transversely oblique, irregular subrectangular areole anteriorly, followed by two irregular trigonal ones, all the areoles subnitidous within; posterior face with an elongate linear areole medially, the lateral areas subnitidous to obscurely and microscopically subfavose laterally; lateral carinae well developed, briefly forked below; lateral faces nitidous on anterior half, obscurely and microscopically favose and obliquely striate on posterior half.

Legs with femora and tibiae sparsely clothed with long, suberect, silvery setulae; middle and hind tibiae with a number of long, slender, irregularly arranged, suberect, testaceous spines on outer faces. Middle tibiae with one distinct calcar; hind tibiae with two stout, elongate calcaria. Fore tarsi with a pecten, though not as strong as in females.

Abdomen slender, elongate, fusiform; tergites subfulgid, the first subglabrous, remaining ones sparsely clothed with an inconspicuous puberulent light pile, and traversed by microscopically fine clathrate aciculation, superposed on which is a series of extremely fine, microscopic, scarcely visible, well separated acupunctures; penult tergite with punctures somewhat larger, coarser and closer and bearing longer reclinate, aeneous hairs; ultimate tergite with a subtrapeziform pygidial area, the disc fulgid and with well separated, rather regularly arranged, setigerous punctures somewhat coarser than those of penult tergite, and each bearing a decumbent aeneous setula. Sternites perfulgid, glabrous except for a transverse preapical row of rather long, erect setulae; all sternites, including the visible apical ones, simple and unmodified.

Female. — Unknown.

Paratype. — 1 ♂; Topotypical. Same data as type.

The paratypic specimen agrees with the type in all essential features of livery and structural detail.

There is a possibility that the present species may eventually prove to be the opposite sex of *sacuya*, since each is known at present from but one sex, *amahuaca* from the male, and *sacuya* from the female sex. Inasmuch as both species were taken at the same locality and presumably on the same date, this would seem to be a logical assumption, were it not for the fact that they differ so markedly in the character of the clypeus and front, and the structure of the pronotum and particularly of the scutellum. These disparities are too great to be attributed to mere sexual antigeny.

*Entomocrabro richardsi*,<sup>10</sup> n. sp.

This and the following Guatemalan species constitute a small group separable from the three preceding forms by the strongly arched mesonotum with the anterior portion vertically declivous to the level of the much depressed pronotum. In common with *amahuaci* the front of each of these species is armed with a porrect spinoid tubercle, but the clypeal structure of both *richardsi* and *bequaerti* is more like that of *sacuya* and *Dukei* than of that form.

The incompletely developed sternauli, the indistinct supraorbital foveae, and the ecarinulate mesonotum, as well as the generally perfulgid habitus, differentiate the present British Guianan form *richardsi* from the following Guatemalan species *bequaerti*.

Type. - ♀; Moraballi Creek, Essequibo River, British Guiana. September 15, 1929. (Oxford University Expedition.) [British Museum (Natural History).]

Female. — 4 mm. long. Black; the following stramineous: palpi, mandibles except rufous apices, clypeus discally, scapes (tinged with fulvous apically), pronotal tubercles, fore and middle legs distad of coxae, hind trochanters, and hind tibiae on basal third. Fore and middle tibiae tinged above, hind tarsi, and axillary sclerites, dilute fulvous. Tegulae and margin of median clypeal lobe, pellucid hyaline. Pedicel and hind femora and tibiae, dark fulvous. Wings clear hyaline, iridescent; veins and stigma fulvous.

Head generally perfulgid; clypeus, except disc, and margins of lower inner orbits clothed with appressed silvery pile; occiput and temples thinly clothed with sparse, appressed, short silvery pubescence. Front on lower vertical aspect subopaque, with microscopically fine reticulate lineation; upper two thirds and vertex perfulgid, glabrous and nitidous except for a very few sparse and scattered setigerous acupunctures,

<sup>10</sup>) Dedicated to Dr. O. W. Richards of London, England, in recognition of his contributions to the study of the Neotropical Hymenoptera.

each bearing a short erect hair; upper half of front bisected by a deep furrow running forward from median ocellus and ending on lower half in upper margin of the median, vertical, narrow, linear, elongate sublanceolate basin running dorsad from the antennal sockets, at base of which is a very small spinoid tubercle medially just above bases of antennae. Ocelli arranged in an equilateral triangle, the postocellar line two-thirds the length of the ocellocular distance, diameter of ocelli subequal in length to postocellar distance, vertex bisected by a very deep longitudinal furrow running caudad almost from median ocellus to occiput; supraorbital foveae small, short, oblique, opaque, lenticular. Temples perfulgid, particularly behind; temporal carinae wanting; occipital carinae present, well developed but not meeting on midventral aspect of head. Antennae reaching about to tubercles; scape subcylindrical, slender, elongate, almost two-thirds (.65) the vertical length of eye; pedicel obterete, one and two-thirds the length of first flagellar article; flagellum finely puberulent, simple, first two segments subequal in length. Clypeus narrow, transverse, median length one-fifth the vertical length of eye, flat laterally to inconspicuously tumid discally, produced medioapically into a short, broad, truncate, glabrous and nitidous lobe, the apical width of which is subequal to median clypeal length, and laterad of which on each side are two strong teeth. Mandibles slender, falcate, apices acuminate, simple, lower margins deeply excised medially, and provided with rather long, strong ammochaetae.

Thorax with pronotum fulgid, narrow, transverse, linear, much sunken below the level of the strongly arched mesonotum, and thinly clothed with decumbent silvery puberulent pubescence; the anterior dorsal margin rounded, ecarinate except very briefly so laterally on each side in neighbourhood of the rounded humeral angles, the dorsal surface flat, simple, anareolate. Mesonotum strongly arched, vertically declivous anteriorly but not overhanging the much depressed pronotum, anteriorly subopaque and with fine, moderately close, setigerous acupunctures bearing decumbent silvery pubescence, discally and posteriorly perfulgid, glabrous and nitidous save for a few scattered setigerous acupunctures; anterior declivous portion of mesonotum with two widely separated, parallel, longitudinal and weakly foveolate furrows each ending on horizontal surface in a short, deep, subfoveolate, lenticular

impression; suture between mesonotum and scutellum deep, broad, with a transverse series of foveae; scutellum perfulgid, flatly tumid, with a few scattered and well separated setigerous acupunctures, hind margin foveolate; postscutellum perfulgid, simple, flat, glabrous, hind margin finely foveolate. Mesopleura with fine, close setigerous acupuncturation on prepectus which is clothed with decumbent silvery pubescence, remainder, above hypersternauli, glabrous and nitidous; anteriorly with a strong epicnemium; omauli, episternal suture, and hypersternauli present, well developed, and foveolate; sternauli absent; mesopleural pit weak; posterior margin minutely foveolate. Mesosternum not margined anteriorly, clothed with fine appressed silvery pubescence. Metapleura glabrous, nitidous, hind margin with a series of rather coarse foveolae. Propodeum perfulgid; dorsal face glabrous, subnitidous, mediobasally with a transverse series of three large subquadrate areoles, the median one the largest and followed by a smaller quadrate one, this followed by a broad, narrow and transverse, pentagonal areole, the surface elevated, flat and nitidous between anterior lateral quadrate areoles and posterior pentagonal areole and laterad of small quadrate discal areole, the lateral areas sunken, and traversed by several oblique, subparallel carinulae; posterior face with a deep, narrow, elongate cuneate impression discally, the lateral areas subfulgid, below and laterally above with setigerous acupunctures bearing decumbent, sparse, rather long pile and traversed by a few fine horizontal rugulae, medially above glabrous and nitidous; lateral carinae strong, well developed, forked briefly below; lateral faces with a microscopically fine reticulate lineation stronger posteriorly than anteriorly, and with oblique subparallel irregular rugulae behind.

Fore legs with trochanteral and femoral ammochaetae present; fore tarsi with a long and strong pecten. Middle tibiae with a few, hind tibiae with many, slender elongate testaceous spines on outer faces.

Abdomen missing.

Male. — Unknown.

This species is known from only the single imperfect female described above from British Guiana. However, inasmuch as practically all the important diagnostic features of the species of *Entomocrabro* lie in the structure of the head and thorax, and, in view of the fact that *richardsi* is such a distinctive form, the species has been described despite the fact that the abdomen is missing.

*Entomocrabro bequaerti*,<sup>11</sup> n. sp.

As in *richardsi*, the mesonotum of *bequaerti* is strongly arched and the front armed with a spinoid tubercle medially above the antennal sockets, but the complete and well developed sternauli, the arcuate dorsal surface of the pronotum, the quadricarinulate anterior portion of the mesonotum, the distinct supraorbital foveae, as well as the more opaque front, vertex and mesonotum, readily distinguish this Central American species from the preceding Guianan form.

Type. — ♀; Moca, Guatallon, Guatemala. Elevation, 1000 meters. March-Abril, 1931. (J. Bequaert.) [Museum of Comparative Zoölogy, Harvard College.]

Female. — 4 mm. long. Black; the following stramineous: palpi, mandibles basally, scapes, pronotal tubercles, all trochanters, tibiae and tarsi, fore femora except for a dilute badeous flush above, and middle femora at base and apex. The following dilute fulvostramineous: mandibles medially (the apices rufous), tegulae, and axillary sclerites. The following light brunneous: pedicel, flagellum, middle and hind femora, and hind tibiae beneath. Wings clear hyaline, iridescent; veins and stigma castaneous.

Head subfulgid; clypeus, except disc, clothed with appressed silvery pile; front and vertex subglabrous; occiput and temples with fine, sparse, decumbent puberulent pubescence. Front and vertex with a microscopically fine reticulate lineation superposed on which are a few scattered setigerous acupunctures bearing short suberect setulae; front with upper half bisected by a deep groove running forward from median ocellus and terminating in the median longitudinal nitidous elongate linear-lanceolate basin on vertical anterior aspect, and with a large porrect spinoid tubercle medially just above antennal sockets. Ocelli arranged in an equilateral triangle, the post-ocellar line five-eighths the length of the ocellocular line, diameter of ocelli subequal in length to postocellar distance, vertex bisected by a deep longitudinal furrow running caudad from between hind ocelli to occiput; supraorbital foveae distinct, opaque, oblique, lenticular. Temples fulgid, without sculpture; temporal carinae wanting; occipital carina present but not meeting on midventral aspect of head. Antennae reaching

<sup>11</sup>) Dedicated to its collector, the distinguished Hymenopterist, Dr. Joseph C. Bequaert of the Harvard University School of Tropical Medicine.



about to tubercles; scape slender, subcylindrical, elongate, two-thirds the vertical length of eye; pedicel cylindrical, elongate, one and two-thirds the length of first flagellar article; flagellum slender, simple, first two segments subequal in length. Clypeus narrow, transverse, median length one-sixth vertical length of eye, flat laterally to tumid discally, produced medio-apically into a short broad glabrous nitidous truncate lobe, the apical width of which is subequal to median length of clypeus, and laterad of which on each side are two large strong teeth. Mandibles falcate, the apices simple and acuminate, lower margins deeply excised medially and provided with rather long, strong ammochaetae.

Thorax with pronotum subfulgid, very narrow, transverse, linear, situated much below the level of the strongly arched mesonotum, and finely punctate, the anterior dorsal margin rounded medially but transversely carinate laterally, the dorsal surface behind carinae with a transverse series of small areoles, the humeral angles rounded. Mesonotum strongly arched, vertically declivous anteriorly but not overhanging the pronotum; anteriorly opaque, rather closely acupunctate, and clothed with decumbent silvery pubescence, discally and posteriorly subfulgid, and with surface lineation, puncturation and setulae like that of front; anterior declivous portion of mesonotum with four longitudinal, parallel carinules medially, the two outer ones ending on horizontal surface in short, deep lenticular impressions; suture between mesonotum and scutellum deep, foveolate; scutellum fulgid, flatly tumid, with fine, well separated, setigerous acupuncturation, posterior margin minutely foveolate; postscutellum fulgid, flat, posterior margin minutely foveolate. Mesopleura fulgid; prepectus with fine close acupuncturation and clothed with appressed silvery pubescence, remainder glabrous with microscopically fine reticulate lineation; anteriorly with a strong epicnemium; omauli, hypersternauli, and episternal suture more or less foveolate, sternauli present and well developed for entire distance to middle coxae, episternal pit distinct; posterior margin simple, without foveolae. Metapleura glabrous, fulgid, with surface lineation like that of mesonotum, hind margin with a series of coarse foveolae. Mesosternum opaque, acupunctate, clothed with appressed, puberulent silvery pubescence. Propodeum glabrous, fulgid; dorsal face basally with a median nitidous trigonal area, the margins as well as a bisecting furrow of

which are foveolate, the lateral areas microscopically subfavose and traversed by a few oblique, subparallel carinulae; posterior face discally with a deep median longitudinal furrow, laterad of which the surface is subnitidous, the valvular area and surface adjacent to the lateral carinae with transverse subparallel horizontal rugulae; lateral carinae well developed, briefly forked below; lateral faces subnitidous anteriorly, microscopically subfavose posteriorly and with a few oblique, subparallel carinulae.

Fore legs with trochanteral and femoral ammochaetae, the tarsi slightly flattened and with a strong somewhat irregular pecten. Middle tibiae with a few, hind tibiae with many, strong, slender, elongate, testaceous spines on outer faces.

Abdomen elongate fusiform, more or less fulgid. First tergite impunctate, subnitidous and subglabrous, remaining tergites, except last, with a fine inconspicuous appressed pubescent silvery pubescence; second to fifth tergites with a very fine, inconspicuous, microscopic, transverse aciculation: ultimate tergite with a broad, equilaterally trigonal pygidium, the disc perfulgid and with a few well separated, regularly arranged, setigerous punctures bearing short decumbent light aeneous setulae. Sternites subnitidous and subglabrous save for a transverse subapical row of small short suberect setulae; ultimate sternite closely and finely acupunctate and finely pubescent medioapically.

Male. -- Unknown.

This distinctive Central American form is known only from the unique female described above.

### **Sinopse dos Triatomídeos**

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(Com 28 figuras no texto)

Em Julho de 1936, sob o título «Notas e commentarios sobre triatomídeos. Lista de espécies e sua distribuição geographica», demos publicidade, na «Revista de Entomologia», vol. 6, fasc. 2, a uma contribuição sobre os triatomídeos afim de

sobretudo, auxiliar pesquisadores da matéria e que não têm facilidade de dispor de boas coleções e adequada bibliografia. O presente artigo foi elaborado com a mesma orientação e embora não cancele o mencionado trabalho, vem servir-lhe de suplemento registrando dados e fatos novos adquiridos nos últimos 5 anos.

Na lista então por nós divulgada, conseguimos reunir 75 espécies distribuídas por 61 países. Tivemos o cuidado de fazer acompanhar cada espécie da sinonímia científica e incluímos, também, a respectiva distribuição geográfica. Quasi um lustro depois, o material que coligimos, não só pelo estudo de espécies por nós criadas em laboratório e pela observação atenta das pesquisas sobre triatomídeos feitas no Brasil e no estrangeiro, levaram-nos a dar publicidade à presente contribuição na suposição que represente alguma utilidade ao crescente número de interessados pelo assunto que assim ficarão em dia com as adições e correções feitas.

Entre estas, uma das mais interessantes é a eliminação do *Adricomius annulatus* Distant, espécie descrita em 1903 procedente de Samóia e que não pode permanecer entre os triatomídeos. Já suspeitávamos, pela descrição, que a referida espécie não se enquadrasse no grupo que estávamos tratando; não tínhamos, porém, elementos para resolver a dúvida. Devido à nímia gentileza do Sr. W. E. China obtivemos fotografias representando dois aspectos do inseto, que figura nas coleções do Museu Britânico como exemplar único, e que vieram resolver definitivamente o assunto já que reproduzem o tipo que ali se encontra (vide figs. 1 e 2).

Para compensar a eliminação dentre os triatomídeos deste gênero e espécie, as investigações feitas levaram a acrescentar mais cinco gêneros à lista por nós publicada (*Bolboderia*, *Cavernicola*, *Dipetalogaster*, *Paratriatoma* e *Triatomaptera*). O número de espécies ou subespécies a acrescentar, como é natural, foi bem maior, atingindo o total de 18. Por outro lado, algumas das espécies anteriormente consideradas válidas caíram em sinonímia (*Triatoma coxo-rufa*, *T. pinto*, *Eutritoma sonoriensis*, e *Panstrongylus tenuis*), bem como *Callotriatoma cubana* e *Triatoma chilena*, descritas por Usinger em 1939.

Como resultado ficou patente que os triatomídeos são em número bem maior do que conhecíamos. A princípio, levadas pelo interesse médico, as pesquisas se faziam principalmente nos domicílios e adjacências. Com o desenvol-

vimento tomado pelos estudos relativos ao *Schizotrypanum cruzi*, cuja presença já foi comprovada nos Estados Unidos infestando varias espécies de triatomídeos, os trabalhos desenvolveram-se ainda mais e algumas surpresas começaram a surgir.



Fig. 1. *Adricomus annulatus* Distant, 1903. Tipo fêmea, procedente de Samôn, exemplar do Museu Britânico, fotografado graças a gentileza de W. F. China, aumentado quasi 2 vezes.  
 -- Fig. 2. *Idem*, cabeça e torax de perfil, mesmo exemplar da fig. 1; aumentado quasi 7 vezes

Assim, vemos o aparecimento de formas genericas bastante afastadas do tipo comum, como ocorreu, por exemplo, com *Cavernicola*. Bem recentemente surgiu maior surpresa que nos levou a criar um novo genero sob o nome de *Triatomaptera* que até agora não tem sua prioridade garantida porque Mazza, Gajardo e Jörg descreveram, com antecipação de alguns dias, na Argentina, um genero novo baseado, em parte, na mesma espécie com que trabalhamos. Este assunto, que ainda não está inteiramente resolvido, foi objeto de desenvolvida comunicação nossa, publicada em 1940, nas «Memorias do Instituto Oswaldo Cruz», vol. 35, fasc. 2, sob o titulo «Estudos sobre os Triatomídeos do Chile: Interessante caso de provavel polimorfismo» em que discutimos o assunto. De um modo ou de outro, na verdade,

este triatomídeo veio trazer ainda maior interesse para o estudo dos insetos deste grupo porque um fato é indiscutível, descobriu-se uma espécie de triatomídeo cuja imagem se apresenta aptera.

Aliás, sobre este assunto, Mazza, Jörg & Gajardo acabam de publicar («Estudios sobre Triatomidae. Debatida posición sistemática de un Triatomídeo chileno». Publ. no. 50 Mis. Est. Pat. Reg. Arg., 1941, 34 pp., 24 figs.) um artigo no qual chegam a conclusão de que o problema ainda não está resolvido, nada tendo podido adicionar ao nosso trabalho anterior, publicado, justamente, com a intenção de facilitar qualquer resolução.

O tom de polemica que Mazza, Jörg & Gajardo dão aos seus artigos, o que é aliás corrente em algumas publicações do Brasil e outras partes da America do Sul, é inteiramente fóra dos nossos moldes em apresentar as contribuições científicas da nossa lavra, pois seguimos as tradições que Oswaldo Cruz procurou sempre manter nas publicações todas as vezes que havia dissensões científicas.

Neste particular não acompanharemos os ilustres colegas argentinos e chileno. Mas não deixaremos de lembrar que algumas das afirmações feitas no artigo de Mazza, Jörg & Gajardo e a nós atribuídas não são verdadeiras.

Jamais afirmamos que o dimorfismo alar em heterópteros é um fato excepcional e duvidoso; o que escrevemos, à página 347, é o seguinte:

«Sabíamos da existência, entre os hemipteros, de espécies onde um dos sexos não possuía asas ou as apresentava atrofiadas, e a isso fizemos alusão na nota prévia:

«As asas faltam nos dois sexos e esta é a primeira vez que isto é referido nos insetos deste grupo, existindo sómente a verificação do facto em vários grupos superiores de hemípteros, mas, sómente num dos sexos.»

Estávamos referindo claramente a triatomídeos, embora soubéssemos que o fenómeno ocorria na ordem. Isto é inteiramente diferente do que Mazza, Jörg & Gajardo escrevem, assegurando que é de nossa autoria:

«Afirmar que el dimorfismo alar en heterópteros, es hecho excepcional y dudoso, es denunciar falta de información sistemática morfológica en este grupo de hemípteros.»

Tal conceito não está publicado em nenhum de nossos trabalhos. Pelo contrario, indicamos que conhecíamos a existência de dimorfismo sexual em hemipteros, o que seria ir-

risorio desconhecer, mas não em triatomídeos; e salientamos nossa estranheza para o que acontecia com *Paredocla Decorsei*, fato que o próprio Jeannel acentua como notável e surpreendente. Não relatamos, é verdade, uma extensa lista de espécies de várias famílias de hemípteros da Alemanha, selecionados através da monografia de Michalk (1938) ou outra qualquer.

O tom dogmático empregado pelos autores leva-os a erros como, por exemplo, quando discordam da existência de 7 segmentos dorsalmente aparentes, além dos genitais, no abdômen dos triatomídeos, interpretando:

«La impresión triangular del dorso del primer segmento abdominal, no es pues un segmento aislado sino una modificación del relieve «sobre la que se apoya el ápice del escutete.»

Não precisamos demonstrar a presença de 7 segmentos abdominais nos triatomídeos porque isto já foi feito, em 1936, por H. Galliard, em seu trabalho «Recherches sur les Réduvidés hématophages *Rhodnius* et *Triatoma*», publicado nos «Annales de Parasitologie», vol. 14, n.º 4, onde o assunto é estudado às páginas 291-292 e fig. 1, e que transcreveremos para conhecimento mais amplo, sem necessidade de qualquer comentário:

«Il est en général assez, difficile de compter le nombre exact des segments abdominaux des hémiptères. Chez certains des hémiptères aquatiques, la majorité des auteurs reconnaît neuf urites. L'étude des larves âgées et des adultes montre qu'il existe un premier segment abdominal réduit à un mince bourrelet tergal accolé au métathorax. Aussi Verhoeff (1894), Peytoureau (1895), Poisson (1924), etc., admettent l'existence de 10 urites abdominaux parfaitement reconnaissables chez les mâles de tous les hémiptères aquatiques. Il y a donc 7 segments abdominaux indépendants et 3 segments génitaux, qui entrent dans la constitution de l'armature génitale.»

«Chez *Cimex lectularius*, on a l'habitude de compter 6 segments abdominaux, les 7<sup>e</sup>, 8<sup>e</sup> et 9<sup>e</sup> constituant l'armature. Christophers et Cragg (1921) ont montré que le segment 1 des classiques était en réalité le 2<sup>e</sup>. Il en existe un premier, mais qui est peu apparent. Son sternite n'existe pas, mais son tergite est une portion du 2<sup>e</sup> tergite (premier des auteurs), isolée par un épaississement très net. Christophers et Cragg appuient leur conviction sur les faits suivants: le segment qui est considéré comme le 8<sup>e</sup> est en réalité le 7<sup>e</sup> car il porte sur sa face ventrale une paire de stigmates. Les segments suivants n'en portent pas. Or, chez la plupart des insectes, la dernière paire de stigmates se trouve sur le 8<sup>e</sup> segment, sauf chez les lépidoptères et les diptères qui la portent sur le 7<sup>e</sup>.»

«Ainsi les hémiptères du genre *Cimex* présentent bien 10 segments, les trois derniers constituant l'armature génitale.»

«Chez les triatomés mâles ou femelles, l'abdomen est constitué par 6 segments apparents, le 7<sup>e</sup> étant déjà différencié, en particulier chez la femelle. Ces 6 segments portent une paire de stigmates apparents. N'y a-t-il pas en réalité 7 et non 6 urites pré-génitales comme chez certains autres hémiptères et *Cimex* en particulier?»

«Lorsque l'on étudie le premier segment apparent, on constate que, vu sur sa face ventrale, il est fortement échancré de chaque côté de la ligne médiane, sur son bord proximal, qui s'articule avec le métathorax. Comme chez *Cimex*, il semble donc bien que ce premier segment ne présente pas de sternite visible (fig. 1, B).»

«Vu par la face dorsale, on voit que le premier tergite présente en sa partie médiane et postérieure une sorte de dépression quadrangulaire limitée par un bourrelet très net. Au-dessus, à la partie tout à fait antérieure de l'urite se trouve une surface triangulaire ayant pour base le bord proximal du premier tergite et dont le sommet vient faire un saillant dans la dépression postérieure. Ceci n'est visible que lorsque l'on enlève le thorax. Cette dépression correspond à un tergite (fig. 1, A).»

«Par analogie avec certains hémiptères et en particulier avec *Cimex*, nous admettons que le premier urite apparent n'est en réalité que le deuxième et que l'abdomen des triatomídeos présente 10 segments ou urites.»

Aliás, Galliard sómente confirmou para os triatomídeos o que já era conhecido ha muito para os hemipteros em geral, conforme é possível entender lendo o que Berlese, em «Gli Insetti», vol. 1, 1909, p. 258, escreve:

«Realmente il 1.<sup>o</sup> urite tende a scomparire, compenetrandosi nel torace, come si è già veduto.

«Più presto e più facilmente se ne va il 1.<sup>o</sup> sternite divenendo «*metafragma*», ed in moltissimo casi, anzi nella maggior parte dei casi, «a cominciare già da taluni Ortoteri (Acrididi, Mantidi, ecc.) il 1.<sup>o</sup> «sternite è totalmente compenetrato nel torace, mentre tuttavia permane «distinto il corrispondente tergite.»

Páginas adiante, o conhecido autor cita vários exemplos de redução do 1.<sup>o</sup> urito e mesmo do 2.<sup>o</sup> em hemipteros, dando figuras (pp. 264-266, figs. 301-304) e assim concluindo (p. 266):

«Per gli Eteroteri si notano accentuate tendenze alla riduzione «del 1.<sup>o</sup> urite e a diminuzione notevole del 2.<sup>o</sup>, il cui sternite spesso «scompare del tutto, giungendo così allo stato che mostrano alcuni «Coleoteri.»

Também se verificou que o número de espécies aumenta rapidamente nos países onde os estudos se fazem com mais interesse, como ocorreu, por exemplo, no México onde o número de espécies aumentou de 7, após a publicação de nosso trabalho de 1936. Mesmo no Brasil, onde as investigações sobre este grupo se fazem com mais intensidade e há mais tempo, o número de espécies que assinalávamos foi aumentado de 4. A ecologia das espécies ficou também melhor conhecida e um campo novo se abriu aos pesquisadores, qual o do encontro de representantes desta família em ninhos de aves silvestres na Argentina, Brasil e Venezuela, e habitações de morcegos no Panamá.

Os investigadores deverão encontrar campo maior de estudos se procurarem concentrar seus esforços em zonas afastadas dos domicílios. Ainda recentemente, aqui no Brasil, onde são conhecidas 31 espécies válidas, Lent & Martins, no Estado onde estes trabalhos têm sido feitos com mais cuidado e há mais tempo, o de Minas Gerais, encontraram uma nova espécie vivendo distante das habitações, entre as pedras de uma velha muralha. Na floresta, o mesmo provavelmente ocorrerá.

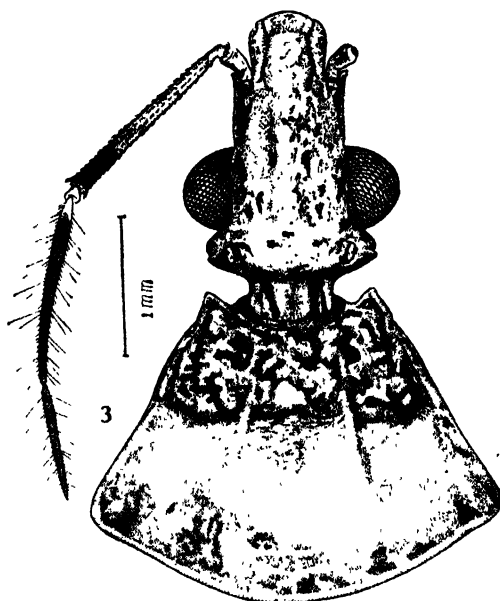


Fig. 3. — *Psammolestes coreodes* Bergroth, 1911. Cabeça e pronoto, vista dorsal. Segundo Lent, 1935.

Alguns fatos novos têm sido conquistados pela criação de espécies no laboratório e nossa experiência, neste particular, já atinge a cerca de uma vintena de espécies; atualmente temos em criação 15 triatomídeos autóctones ou exóticos.

As primeiras criações em laboratório, feitas no Instituto Oswaldo Cruz, foram realizadas por Oswaldo Cruz, Chagas e Neiva, os quais se aproveitaram da técnica usada pela Comissão Francesa para Estudo da Febre Amarela no Rio de Janeiro, composta de Marchoux, Salimbeni e Simond, que criavam o *Argas persicus* da maneira figurada no trabalho que Pinto publicou em 1925. Tal método,



em Manguinhos, foi mantido por Henrique Aragão para seus estudos a respeito do ixodídeo em questão. A técnica usada, que permitiu a Neiva estudar e divulgar os primeiros dados sobre a evolução e os hábitos destes insetos, foi adaptada por Brumpt para os climas frios e, já em 1913, a 1.<sup>a</sup> edição do «Précis de Microscopie», de Langeron, publica o modo de criar usado no Laboratório de Parasitologia da Faculdade de Medicina de Paris, na estufa a 25.°C., os «barbeiros» sendo alimentados sobre qualquer animal. Em 1921, na 3.<sup>a</sup> edição, o assunto é mais explanado e em 1925, na 4.<sup>a</sup> edição, a técnica publicada por Langeron dá preferência aos pombos para a alimentação dos triatomídeos.

Em 1925, Cesar Pinto publicou a tese «Ensaio monographico dos Reduvidos hematophagos ou barbeiros», na qual consagra um capítulo relativo à criação dos triatomídeos, com fotografias mostrando o dispositivo usado para permitir a fácil sucção dos animais empregados para a alimentação, que eram cobaias.

Larrousse, em 1927, no artigo «Étude biologique et systématique du genre *Rhodnius* Stal (Hémiptères, Reduviidae)», publicado nos «Annales de Parasitologie», vol. 5, n.º 1, mostra, com detalhes e fotografias, a técnica usada no Laboratório de Brumpt, preferindo pombos para alimentação por serem animais doces e refratários à doença de Chagas.

Em 1937, Galtsoff, Lutz, Welch & Needham publicam utilíssimo e interessante livro «Culture methods for invertebrate animals», onde omitem a técnica de criação de triatomídeos. Talvez movido por esta falha em livro tão importante, Dias, em 1938, dá à estampa uma contribuição intitulada «Criação de Triatomídeos», publicada nas «Memórias do Instituto Oswaldo Cruz», vol. 33, fasc. 3, divulgando as técnicas usadas no Instituto Oswaldo Cruz e adicionando a modificação de C. B. Philip, que evita o contacto dos insetos com as fezes e urina dos cobaias ou ratos empregados para alimentação.

Preferimos substituir por pombos, a exemplo de Larrousse, o emprego dos cobaias porquanto comprovamos o inconveniente que apresenta para a criação a urina emitida por esses roedores. Os vidros usados para a criação devem, também, permanecer em ambiente escuro, porém, de preferência, colocados em armários com portas de tela com malhas grossas, para facilitar o arejamento. Em certos locais, deve-

se tomar precauções especiais contra as formigas que agri-dem e devoram os insetos em criação e contra um pequeno himenoptero descrito em 1927 por Costa Lima, sob o nome de *Telenomus farii*, que perfura os ovos dos triatomídeos para desovar em seu interior.

### Chave dos gêneros de Triatomidae Pinto, 1926

Dando uma chave para determinação dos gêneros de triatomídeos estamos procurando seguir nossa intenção de promover maior facilidade e rapidez na identificação deste grupo de hemipteros cuja importância é crescente.

Pela experiencia que temos de outros grupos zoologicos em que temos trabalhado, a confecção de uma chave ressentese muito do ponto de vista pessoal de quem a organisa e, de nenhum modo substitue a consulta da diagnose original do gênero e o conhecimento de sua especie tipo.

Os que estão familiarizados com os triatomídeos encontrarão na chave abaixo elementos que lhes facilitem uma identificação rapida, principalmente porque tivemos o cuidado de adicionar uma figura elucidativa de cada caracter utilizado.

Alguns autores não aceitam a validade do gênero *Eutriatoma*, muito proximo de *Triatoma*, muitas especies se intercalando como intermediarias quando se observa a proporção relativa entre o comprimento dos dois primeiros articulos do rostro. Se bem que mantenhamos os dois gêneros, como está na chave, ainda não temos opinião definitiva sobre a validade do gênero *Eutriatoma*. Pinto, 1926.

1. Cabeça com nítida calosidade lateral post-ocular (figs. 3-4). . . . 2
2. Cabeça sem calosidade lateral post-ocular nítida (fig. 5) . . . 4
2. Cabeça curta, pouco mais longa do que larga, inclusive os olhos (fig. 3) (Esp. tipo: *P. coreodes* Bergroth, 1911) . . . . .
- Cabeça comprida, medindo cerca do dobro da largura inclusive os olhos (figs. 6-7) . . . . . 3
3. Rostro com o 1.º segmento maior ou igual ao 2.º (syn. *Marlianus* Distant, 1902) (Esp. tipo: *B. rugulosus* Stal, 1859) . . . . .
- Rostro com o 1.º segmento menor do que o 2.º, cerca de 1/3 menor (fig. 8) (syn. *Callotriatoma* Usinger, 1939) (Esp. tipo: *B. scabrosa* Bruner & Fracker, 1926) . . . . *Bolboderia* Bruner, 1859) . . . . .
4. Insetos alados, macropteros nos dois sexos (fig. 9) . . . . . 5
- Insetos micrópteros nos dois sexos (fig. 10) (syn. *Mepraia* Mazza, Gajardo & Jörg, 1940, p.p.) (Esp. tipo: *T. porteri* Neiva & Lent, 1940) . . . . . *Triatomaptera* Neiva & Lent, 1940
5. Rostro não ultrapassando o nível dos olhos (figs. 11-12) (Esp. tipo: *L. carnifex* Distant, 1904) . . . . *Linshcosteus* Distant, 1904
- Rostro ultrapassando nitidamente o nível dos olhos (fig. 13). . . . 6

6. Cabeça oval, fortemente convexa. Ocelos inconspícuos, implantados sobre o tegumento. Nervuras do cório inconspícuas (figs. 24-26) (Esp. tipo: *C. pilosa* Barber, 1937) . . . *Cavernicola* Barber, 1937
- Cabeça cilíndrica, reta. Ocelos conspícuos, implantados em saliências. Nervuras do cório conspícuas (fig. 9) . . . . . 7
7. Cabeça muito longa e delgada; antenas implantadas em tubérculos inseridos perto do ápice da cabeça (figs. 14-15) (Esp. tipo: *R. prolixus* Stal, 1859) . . . . . *Rhodnius* Stal, 1859
- Cabeça de aspecto diverso; antenas implantadas em tubérculos inseridos no meio da região ante-ocular ou logo adiante dos olhos (figs. 5, 13, 16-17) . . . . . 8
8. Ângulos posteriores do pronoto espinhosos ou agudos. Escutelo com ápice saliente, longo e aguçado (fig. 18) (Esp. tipo: *E. mucronatus* Stal, 1859) . . . . . *Eratyrus* Stal, 1859
- Ângulos posteriores do pronoto arredondados ou obtusos. Escutelo com ápice diferente (fig. 9) . . . . . 9
9. Escutelo com ápice fortemente dirigido, na vertical, para cima. Conexivo com a placa dorsal dupla, lamelada, a ventral inexistente (figs. 27-28) (Esp. tipo: *D. maximus* [Uhler, 1894]) . . . . .  
*Dipetalogaster* Uhler, 1894
- Escutelo com ápice normalmente no mesmo plano do corpo ou levemente voltado para cima. Conexivo normal (fig. 9) . . . . . 10
10. Antenas implantadas em tubérculos inseridos imediatamente adiante dos olhos. Cabeça curta e larga (figs. 16-17) . . . . . 11
- Antenas implantadas em tubérculos inseridos mais ou menos no meio da região ante-ocular. Cabeça alongada (fig. 5) . . . . . 12
11. Corpo intensamente revestido de pêlos longos e finos. Espécie pequena, menor de 14 mm. (figs. 19-20) (Esp. tipo: *P. hirsuta* Barber, 1938) . . . . . *Paratriatoma* Barber, 1938
- Corpo glabro ou revestido de cerdas curtas ou pêlos esparsos. Espécies maiores de 20 mm (syn. *Iamus* Stal, 1859; *Mestor* Kirkaldy, 1904) (Esp. tipo: *P. guentheri* Berg, 1879) . . . . .  
*Panstrongylus* Berg, 1879
12. Rostro com os 2.<sup>o</sup> e 3.<sup>o</sup> segmentos quasi iguais em comprimento (fig. 21) (Esp. tipo: *N. circummaculata* [Stal, 1859]) . . . . .  
*Neotriatoma* Pinto, 1931
- Rostro com o 2.<sup>o</sup> segmento nitidamente maior do que o 3.<sup>o</sup> . . . 13
13. Rostro com o 2.<sup>o</sup> segmento tendo duas ou mais vezes o comprimento do 1.<sup>o</sup> (figs. 22-23) (Esp. tipo: *E. tibiamaculata* Pinto, 1926) . . .  
*Eutriatoma* Pinto, 1926
- Rostro com o 2.<sup>o</sup> segmento tendo menos de duas vezes o comprimento do 1.<sup>o</sup> (fig. 13) (syn. *Conorhinus* Laporte, 1832; *Meccus* Stal, 1859; *Mepraia* Mazza, Gajardo & Jörg, 1940, p.p.) (Esp. tipo: *T. rubrofasciata* [De Geer, 1773]) . . . . *Triatoma* Laporte, 1832

### Lista das espécies

Na lista abaixo damos a relação, em ordem alfabética pelo nome específico, das espécies que consideramos válidas incluindo sua distribuição geográfica por países e no Brasil, acrescentando ainda a distribuição por Estados. Com relação a algumas das espécies fazemos curtos comentários sobre assuntos vários e recentes, incluindo também o local

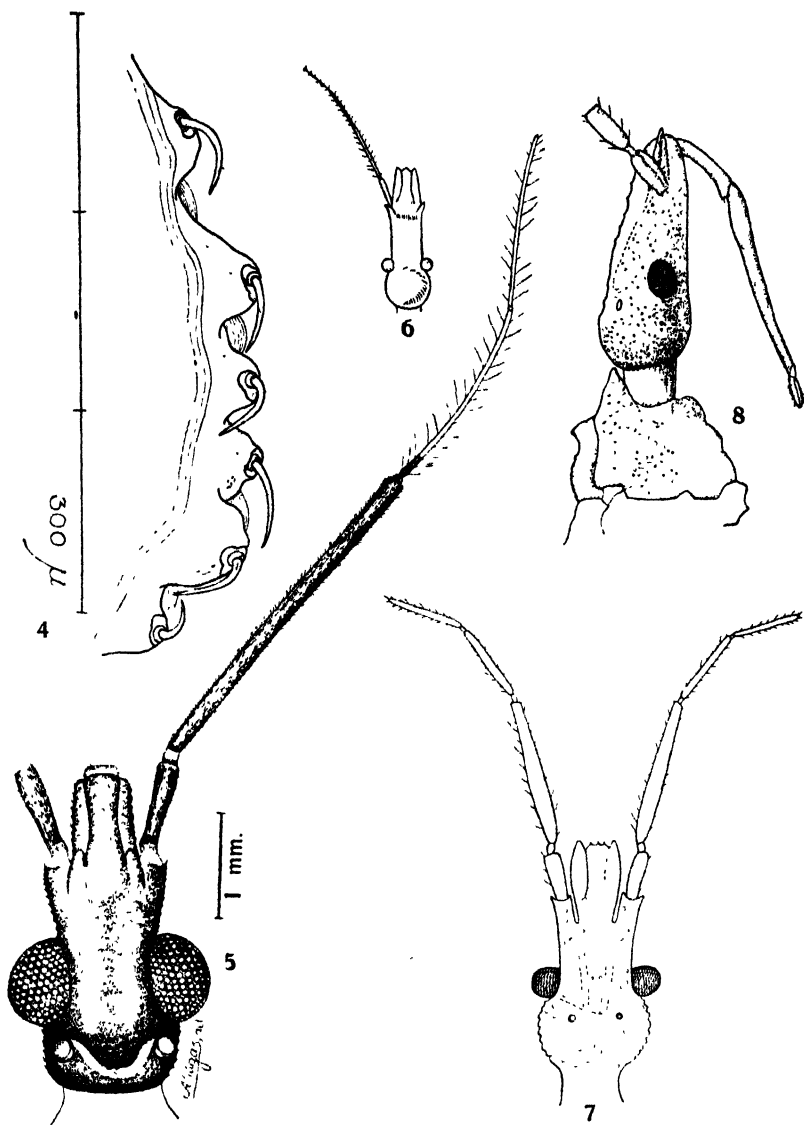


Fig. 4. *Psammolestes coreodes* Bergroth, 1911; detalhe da calosidade lateral postocular. Segundo Pinto & Lent, 1936. — Fig. 5. *Triatoma rubrofasciata* (De Geer, 1773); cabeça, vista dorsal. Original. — Fig. 6. *Helminius rugulosus* Stal, 1850. — Fig. 7. *Holboellera scabrosa* Bruner & Fracker, 1926; cabeça, vista dorsal. Segundo Usinger, 1939. — Fig. 8. *Idem*, cabeça, vista de perfil Segundo Usinger, 1939.

onde está depositado o tipo, quando é do nosso conhecimento. As espécies infestadas em natureza ou experimentalmente, pelo *Schizotrypanum cruzi*, são assinaladas, de acordo com a lista organizada por Lent em 1939 e agora ampliada.

Não foi sem relutância que resolvemos admitir as sub-espécies que aparecem na lista que publicamos, pelo menos até ulterior decisão; si o fazemos é porque está bem generalizado o conceito de sub-espécie

para certos animais que apresentam um ou mais caracteres constantes, repetidos em várias gerações, embora de significação estrutural reduzida. Nestes casos, não se trata de simples variação individual mais ou menos extensa como algumas espécies de triatomídeos apresentam, a exemplo do que acontece com *Triatoma infestans* que, em 1940, foi muito bem estudada por Mazza & Jörg no trabalho «Variabilidad del diseño somático de *Triatoma infestans* Klug», porém de fixação de caracteres de colorido ou tamanho ligados a uma distribuição geográfica mais restrita, regional, e observados em séries grandes de exemplares, mantidos após criação experimental em laboratório, fora portanto de seu *habitat* natural.

1. *Panstrongylus africanus* (Neiva, 1911) Pinto, 1931. — África tropical.

Tipo depositado no Koen. Zool. Mus. de Berlim. Frei Thomaz Borgmeier procurou o exemplar tipo desta espécie e o de *P. howardi* em Agosto de 1932, não mais os encontrando; sómente conseguiu vêr a caixa onde estavam antigamente espetados (com notas a lapis de Neiva), segundo informam Lent & Pifano em 1940.

2. *Psammolestes arthuri* (Pinto, 1926) Pinto & Lent, 1935. — Venezuela.

Tipo no Instituto Oswaldo Cruz.

Infestada em natureza (Pifano in Brumpt, 1939. — Venezuela) e experimentalmente (Torrealba, 1937).

3. *Triatoma arthurneivai* Lent & Martins, 1940. — Brasil (Minas Gerais).

Tipo no Instituto Oswaldo Cruz.

Infestada experimentalmente (Martins, 1941).

4. *Triatoma barberi* Usinger, 1939 — Mexico.

Tipo no Mus. Calif. Acad. Sci.

Infestada em natureza (Mazzotti, 1939. — Mexico).

5. *Panstrongylus bouvieri* (Larrousse, 1924) Pinto, 1931. — Indochina Francêsa.

Tipo no Mus. Hist. Nat. de Paris.

6. *Triatoma brasiliensis* Neiva, 1911, — Brasil (Baía, Ceara, Minas Gerais, Pernambuco, Piauí e Rio Grande do Norte).

Tipo no Instituto Oswaldo Cruz.

Infestada em natureza (Pinto, 1923, — Brasil) e experimentalmente (Castro Ferreira & Deane, 1938).

7. *Triatoma brasiliensis melanica*, n. subsp. — Brasil (Minas Gerais).

Tipo no Instituto Oswaldo Cruz.

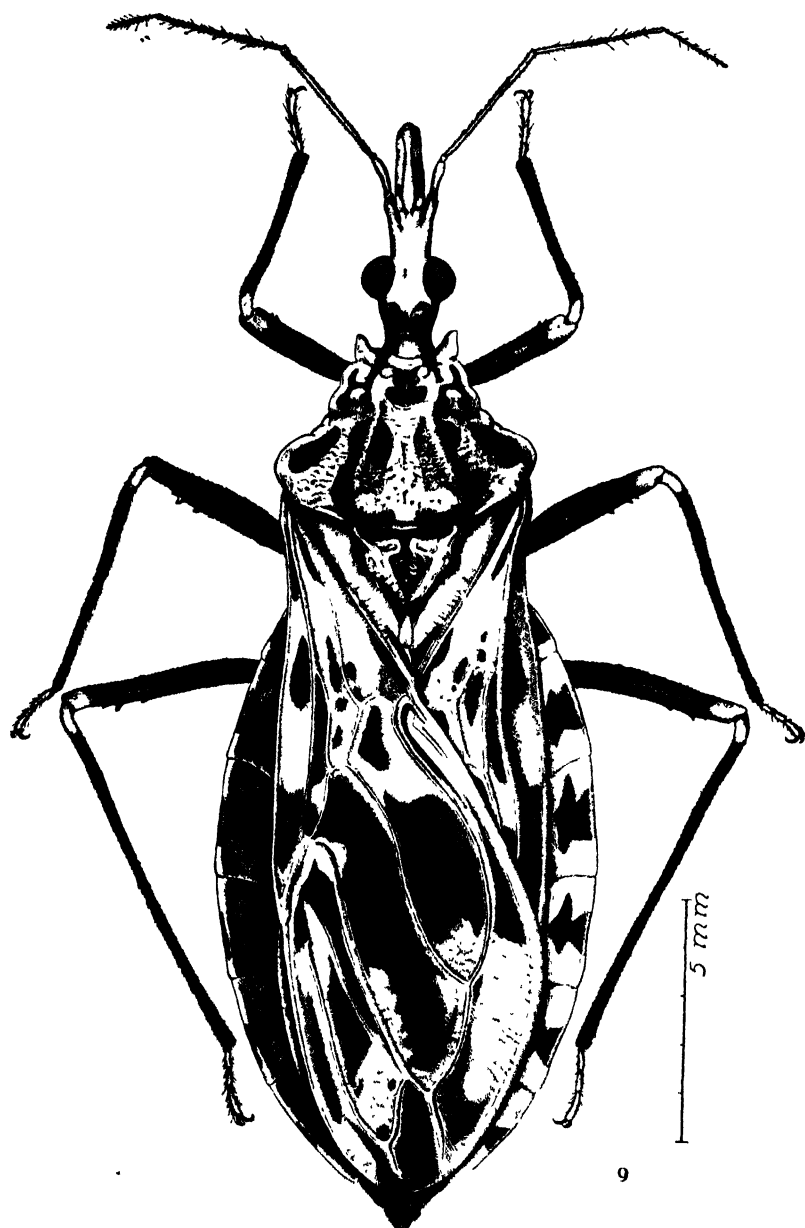


Fig. 9. *Eutritoma nigromaculata* (Stal, 1872); fêmea proveniente de Venezuela. Segundo Lent & Pifano, 1939.

Infestada em natureza (Martins, Versiani & Tupinambá, 1940, Brasil).

Difere fundamentalmente de *Triatoma brasiliensis*: por ter o lóbulo anterior do pronoto sómente com os tubérculos medianos amarelos e o lóbulo posterior com o tegumento preto, exceção feita da mancha lon-

itudinal amarela situada a partir das carenas longitudinais, para fóra. O colarinho é todo preto e os ângulos anteriores também. No escutelo, a ponta tem mancha amarela muito menor do que nos *brasiliensis* típicos. Pleuras e esternos uniformemente escuros. Nas patas, os trocanteres não têm colorido amarelo, são escuros; a mancha amarela em anel no meio dos femures é substituída por pequena mancha amarela irregular que nem sempre é um anel completo; a mancha amarela do ápice das fíbias também existe. Hemelítrios com cório provido de mancha preta mais extensa; só existe amarelo na base e no ponto onde começa a membrana, medianamente; a membrana é de colorido cinzento escuro no centro. Conexivo com manchas semelhantes, porém as pretas são maiores, em prejuízo das amarelas.

8. *Rhodnius brethesi* Matta, 1919. — Brasil (Amazonas).

Tipo? — Duas fêmeas, no Instituto Oswaldo Cruz, da mesma procedência.

9. *Triatoma breyeri* Del Ponte, 1929. — Argentina.

Tipo no Museo de Buenos Aires.

10. *Triatoma breyeri dallasi* Del Ponte, 1929. — Argentina.

Tipo no Museo de Buenos Aires.

11. *Rhodnius brumpti* Pinto, 1925. — Brasil (Ceará e Rio Grande do Norte).

Tipo no Instituto Oswaldo Cruz.

Infestada em natureza (Neiva & Pinto *in* Pinto, 1923, Brasil).

12. *Linshcosteus carnifex* Distant, 1904. — Índia.

Tipo no Museu Britânico.

A descrição genérica de Distant refere a espécie em «Northern districts of India» e a específica em «North India». Entretanto, em 1939, China enviou-nos fotografias do exemplar tipo com a simples indicação «E. Indies».

13. *Eutriatoma carrioni* (Larrousse, 1926) Pinto, 1931. — Equador.

Tipo no U.S. Nat. Mus., Washington.

14. *Triatoma chagasi* Brumpt & Gomes, 1914. — Brasil (Minas Gerais).

Tipo no Laboratório de Parasitologia da Faculdade de Medicina de Paris.

Infestada em natureza (Brumpt & Gomes, 1914, Brasil) e experimentalmente (Brumpt, 1914).

Esta espécie é, de fato, extremamente parecida a *Triatoma vitticeps*. Galliard procura separá-la, principalmente, através de diferenças nos ovos. Os exemplares existentes todos procedem de uma fêmea apanhada

em Lassance e cuja postura permitiu a criação de vários outros espécimens. Ainda persistem dúvidas quanto à identidade das duas espécies.

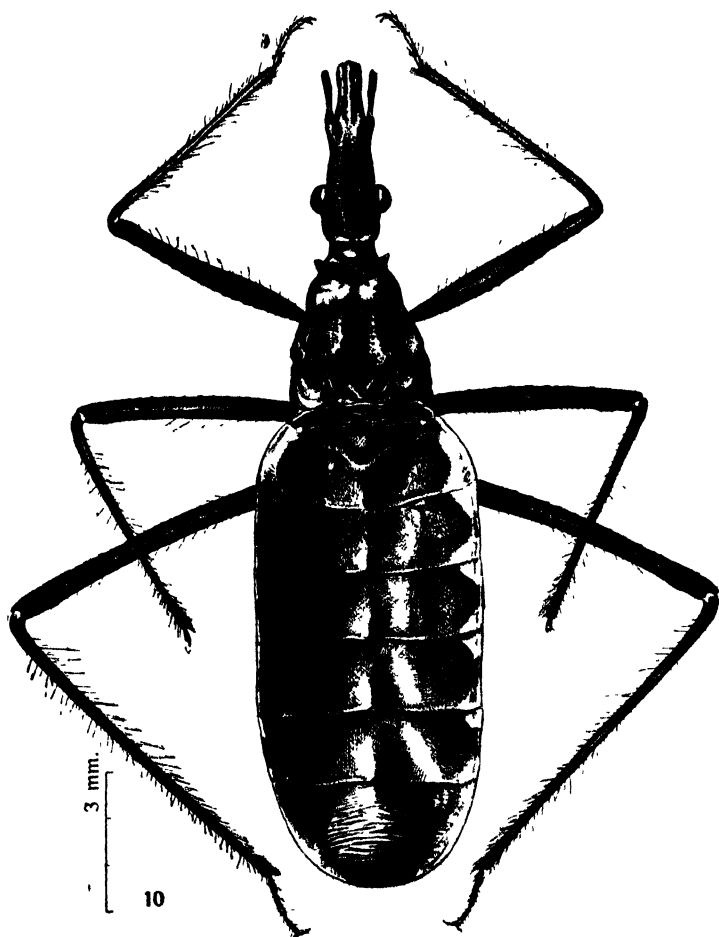


Fig. 10. *Triatomaptera porteri* Neiva & Lent, 1940; macho proveniente do Chile. Segundo Neiva & Lent, 1940.

15. *Panstrongylus chinai* (Del Ponte, 1929) Pinto, 1931.  
— Perú.  
Tipo no Museu Britânico.
16. *Neotriatoma circummaculata* (Stal, 1859) Pinto, 1931.  
— Argentina, Uruguai.  
Tipo no Museu de Berlim.  
Infestada em natureza (Talice *et alii*, 1940, Uruguai).
17. *Psammolestes coreodes* Bergroth, 1911. — Argentina, Brasil (Ceará, Mato Grosso, Minas Gerais e Pernambuco).



Tipo? — Segundo Walter Horn, os tipos de Bergroth foram depositados no Museum Zoologicum Universitatis em Helsingfors (Finlandia). Em carta que endereçou a um de nós, em 14/X/1937, respondendo a solicitação feita, Dr. Richard Frey informa não ter encontrado nas coleções do Museu o tipo desta espécie.

Infestada experimentalmente (Dias, 1936).

18. *Eratyrus cuspidatus* Stal, 1859. -- Colombia, Panamá, Venezuela.

Tipo?

Infestada em natureza (Tejera *in* Lavier, 1921. Venezuela, Panamá).

19. *Triatoma dimidiata* (Latreille, 1811) Neiva, 1914. — Costa Rica, Equador, Guatemala, Honduras, Mexico, Nicaragua, Panamá, Perú, Salvador, Venezuela.

Tipo?

Infestada em natureza (Reichenow, 1934. -- Guatemala, Panamá, Mexico) e experimentalmente (Castro Ferreira & Deane, 1938).

20. *Triatoma dimidiata maculipennis* (Stal, 1859) Champion, 1899. — Mexico, Nicaragua, Salvador.

Tipo no Museu de Berlim.

Infestada em natureza (Hurtado *in* Neiva, 1915, Salvador, Mexico).

21. *Rhodnius domesticus* Neiva & Pinto, 1923. — Brasil (Rio de Janeiro e S. Paulo).

Tipo no Instituto Oswaldo Cruz.

22. *Eratyrus eratyrusiforme* (Del Ponte, 1929) Pinto, 1931. — Argentina.

Tipo no Museo de Buenos Aires.

23. *Eutriatoma flavida* (Neiva, 1911) Pinto, 1931. -- Cuba.

Tipo no U.S. Nat. Mus., Wash.

Infestada experimentalmente (Giordano, 1930).

24. *Panstrongylus geniculatus* (Latreille, 1811) Pinto, 1931. — Argentina, Brasil (Amazonas, Baía, Distrito Federal, Maranhão, Minas Gerais, Pará, Rio de Janeiro e São Paulo), Colombia, Guiana Francêsa, Guiana Holandêsa, Guiana Inglesa, Panamá, Paraguai, Perú, Trinidad, Uruguai, Venezuela.

Tipo?

Infestada em natureza (Chagas, 1912, Brasil, Panamá, Venezuela).

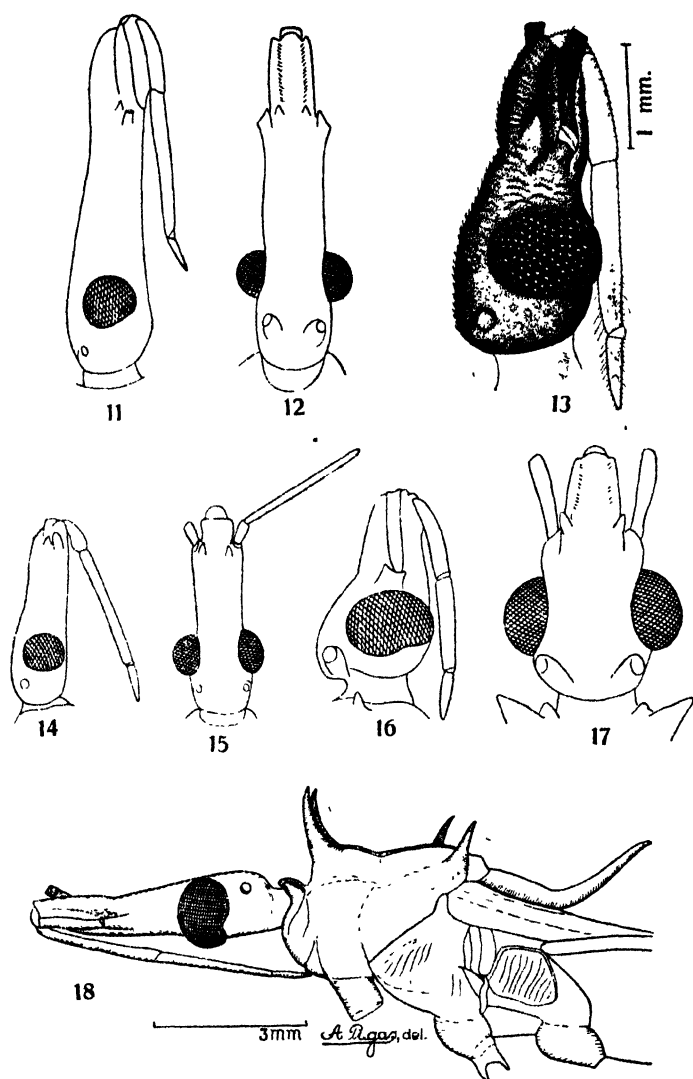


Fig. 11. *Linshcosteus carnisifer* Distant, 1904; cabeça, vista de perfil. Segundo Pinto, 1927. — Fig. 12. *Idem*, cabeça, vista dorsal, Segundo Pinto, 1927. — Fig. 13. *Triatoma rubrofasciata* (De Geer, 1773); cabeça, vista de perfil. Original. — Fig. 14. *Rhodnius prolixus* Stal, 1859; cabeça, vista de perfil. Segundo Pinto, 1927. — Fig. 15. *Idem*, cabeça, vista dorsal. Segundo Pinto, 1927. — Fig. 16. *Panstrongylus megistus* (Burmeister, 1835); cabeça, vista de perfil. Segundo Pinto, 1927. — Fig. 17. *Idem*, cabeça, vista dorsal. Segundo Pinto, 1927. — Fig. 18. *Eratyrus mucronatus* Stal. 1859; cabeça e torax, de perfil. Original.

*Panstrongylus tenuis* (Neiva, 1914) é sinonimo desta espécie, tendo sido descrita do Estado da Baía, Brasil.

25. *Triatoma gerstaeckeri* (Stal, 1859) Banks, 1910. — Mexico, U. S. A.

Tipo no Kgl. Zool. Mus. de Berlim.

- Infestada em natureza (Packchanian, 1939, U.S.A.).
26. *Eutriatoma gomesi* (Neiva & Pinto, 1923) Pinto, 1931.  
— Brasil (Rio Grande do Sul).  
Tipo no Instituto Oswaldo Cruz.
27. *Panstrongylus guentheri* Berg. 1879. — Argentina.  
Tipo no Museo de La Plata, Argentina.
28. *Triatoma hegneri* Mazzotti, 1940. — Mexico.  
Tipo no Instituto de Salubridad y Enfermedades Tropicales de México.
29. *Triatoma heidemannii* Neiva, 1911. — U. S. A.  
Tipo no U.S. Nat. Mus., Wash.  
Infestada em natureza (Packchanian, 1940, U.S.A.).
30. *Paratriatoma hirsuta* Barber, 1938. — U. S. A.  
Tipo no U.S. Nat. Mus., Wash.
31. *Panstrongylus howardi* (Neiva, 1911) Pinto, 1931. — Africa tropical.  
Tipo depositado no Koen. Zool. Mus. de Berlim. Vide nota em *P. africanus*.
32. *Panstrongylus humeralis* (Usinger, 1939) Lent & Pifano, 1940. — Panamá.  
Tipo no Museum of Comparative Zoology, Harvard University.
33. *Triatoma incrassata* Usinger, 1939. — Mexico.  
Tipo no Mus. Calif. Acad. Sci.
34. *Triatoma indictiva* Neiva, 1912. — U. S. A.  
Tipo no U.S. Nat. Mus., Wash.
35. *Triatoma infestans* (Klug in Meyen, 1834) Neiva, 1913. — Argentina, Bolivia, Brasil (Baía, Minas Gerais, Paraná Rio Grande do Sul e S. Paulo), Chile, Paraguai, Perú, Uruguai.  
Tipo no Museu de Berlim.
- Infestada em natureza (Carini & Maciel, 1914, Brasil, Argentina, Uruguai, Chile) e experimentalmente (Chagas & Machado in Chagas, 1912).
36. *Panstrongylus larroussei* (Pinto, 1925) Pinto, 1931. — Argentina.  
Tipo no Instituto Oswaldo Cruz.
37. *Triatoma leopoldi* (Schouteden, 1933) Neiva & Lent, 1936. — Nova Guiné.  
Tipo?

Em 17/11/1939 um de nós escreveu ao Dr. H. Schouteden, diretor do Museu do Congo Belga, Tervueren (Bélgica) pedindo infor-

mações sobre esta espécie. Surpreendentemente, em carta de 9/1/1940, este autor nega ter descrito a espécie, dizendo: «En ce qui concerne votre demande relative au *Conorhinus leopoldi*, je regrette de devoir vous dire que je n'ai pas décrit d'espèce sous ce nom. L'indication qui vous en a été donnée est donc erronée. J'ajouterai du reste que je n'ai jamais décrit de *Conorhinus*». A referência bibliográfica em questão é a seguinte: Schouteden, H., 1933, Résultats scientifiques du voyage aux Indes orientales néerlandaise; de LL. AA. RR. le prince et la princesse Léopold de Belgique Hém. Het., Mém. Mus. Hist. nat. Belg., Brux., 4, fasc. 8, hors série, pp. 43-70 (cf. pp. 43, 64-65).

38. *Panstrongylus lignarius* (Walker, 1873) Pinto, 1931.  
— Brasil (Pará), Guiana Inglesa.

Tipo no Museu Britânico.

39. *Neotriatoma limai* (Del Ponte, 1929) Pinto, 1931.  
— Argentina, Brasil (sem local).

Tipo no Instituto Bacteriológico de Buenos Aires.

40. *Triatoma longipennis* Usinger, 1939. — Mexico.

Tipo no Mus. Calif. Acad. Sci.

Infestada em natureza (Mazzotti, 1940, Mexico).

41. *Triatoma longipes* Barber, 1937. — Mexico, U. S. A.

Tipo no U.S. Nat. Mus., Wash.

42. *Panstrongylus lutzi* (Neiva & Pinto, 1923) Pinto, 1931.  
— Brasil (Baía, Ceará, Paraíba e Rio Grande do Norte).

Tipo no Instituto Oswaldo Cruz.

43. *Eutriatoma maculata* (Erichson, 1848) Pinto, 1931.  
— Brasil (Baía, Ceará, Minas Gerais, Paraíba, Pernambuco, Piauí e Rio Grande do Norte), Guiana Holandesa, Guiana Inglesa, Venezuela).

Tipo no Museu de Berlim.

Infestada em natureza (Dias & Torrealba, 1936, Brasil, Venezuela) e experimentalmente (Dias & Torrealba, 1936).

44. *Dipetalogaster maximus* (Uhler, 1894) Usinger, 1939.  
— Mexico, U. S. A.

Tipo no U.S. Nat. Mus., Wash.

Infestada em natureza (Mazzotti, 1940, Mexico).

45. *Triatoma mazzai* Jörg, 1937 — Argentina.

Tipo na Misión de Estudios de Patología Regional Argentina.

Como esta espécie foi dedicada ao Prof. Salvador Mazza, não pode, pelo artigo 14 das Regras Internacionais de

Nomenclatura Zoológica, ter a designação de *Mazzae*, como foi descrita.

46. *Panstrongylus megistus* (Burmeister, 1835) Pinto, 1931. — Brasil (Baía, Ceará, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Paraná, Pernambuco, Piauí, Rio Grande do Sul, Rio de Janeiro, Santa Catarina e S. Paulo), Guiana Inglesa, Paraguai.

Tipo?

Infestada em natureza (Chagas, 1909, Brasil, Paraguai) e experimentalmente (Chagas, 1909).

47. *Triatoma melanocephala* Neiva & Pinto, 1923. — Brasil (Baía e Pernambuco).

Tipo no Instituto Oswaldo Cruz.

48. *Triatoma mexicana* (H. Schaeffer, 1848) Pinto, 1931. — Mexico.

Tipo?

Esta espécie, desde seu achado inicial, nunca mais havia sido encontrada até que, em 1940, Mazzotti a assinalou novamente, e publicou boa descrição e fotografia. Pelo seu trabalho verifica-se que a figura dada por Pinto, em 1925, não corresponde a espécie de Herrich-Schaeffer, com o que concordamos após verificação do exemplar que existe na coleção do Instituto Oswaldo Cruz.

49. *Triatoma migrans* Breddin, 1903. — Borneo, Estados Malaios, Java, Sumatra.

Tipo?

50. *Eratyrus mucronatus* Stal, 1859. — Brasil (Pará), Guiana Inglesa.

Tipo?

51. *Rhodnius nasutus* Stal, 1859. — Brasil (Ceará).

Tipo?

52. *Triatoma neotomae* Neiva, 1911. — U. S. A.

Tipo no U.S. Nat. Mus., Wash.

53. *Eutriatoma nigromaculata* (Stal, 1872) Lent & Pifano, 1939. — Venezuela.

Tipo?

Infestada em natureza (Lent & Pifano, 1939, Venezuela) e experimentalmente (Lent & Pifano, 1939).

54. *Triatoma nitida* Usinger, 1939. — Guatemala, Honduras.

Tipo no Mus. Comp. Zool. Harvard Univ. O espécimen de Honduras, considerado paratipo, está depositado no U. S. Nat. Mus., de Washington, e tinha o rotulo de «*Triatoma inedita*» Neiva Ms.. Em 1936, Neiva & Lent tinham duvidas sobre a exatidão da identificação que Hase fez do *T. neotomac* na

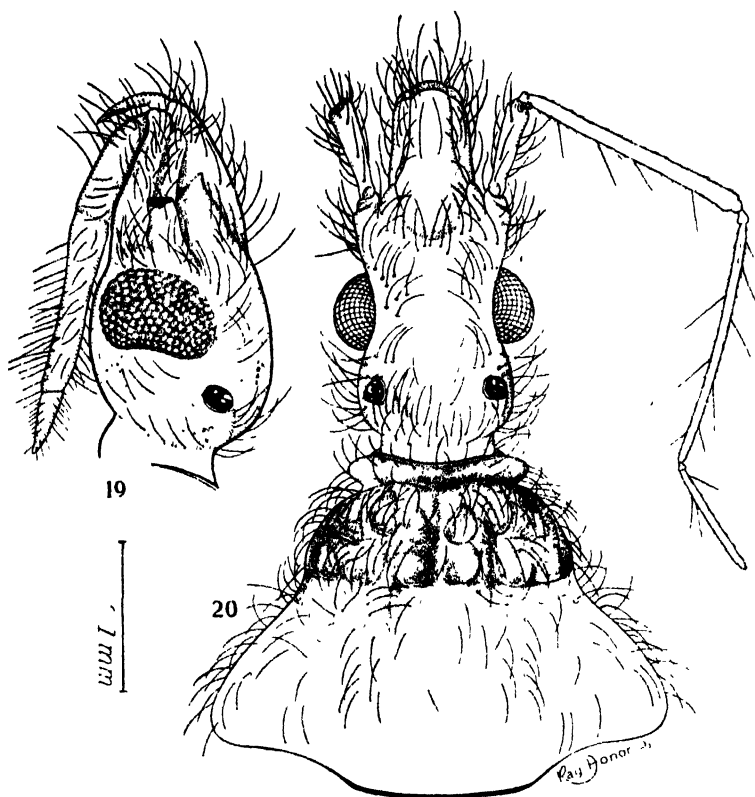


Fig. 19. *Paratriatoma hirsuta* Barber, 1939; cabeça, vista de perfil. Original.— Fig. 20. *Idem*, cabeça e pronoto, vista dorsal. Original.

Venezuela, acreditando na possibilidade de tratar-se de espécie afim. Usinger, ao descrever *T. nitida*, acha possível que seja esta a espécie que Hase encontrou.

55. *Triatoma occulta* Neiva, 1911. — U. S. A.

Tipo no Kgl. Mus. de Berlim.

56. *Triatoma ocellata* Neiva, 1914. — U. S. A.

Tipo no U.S. Nat. Mus., Wash.

57. *Eutriatoma oliveirai* Neiva, Pinto & Lent, 1939. — Brasil (Rio Grande do Sul).

Tipo no Instituto Oswaldo Cruz.

58. *Eutriatoma oswaldoi* (Neiva & Pinto, 1923) Pinto, 1931. — Argentina, Brasil (Distrito Federal), Perú.

Tipo no Instituto Oswaldo Cruz.

Infestada em natureza (Mazza, 1936, Argentina).

59. *Rhodnius pallescens* Barber, 1932. — Panamá.

Tipo no U.S. Nat. Mus., Wash.

Infestada em natureza (Dunn, 1933, Panamá).

60. *Triatoma pallidipennis* (Stal, 1872) Pinto, 1927. — Mexico.

Tipo?

Infestada em natureza (Mazzotti, 1937, Mexico).

61. *Eutriatoma patagonica* Del Ponte, 1929. — Argentina.

Tipo na coleção Berg do Museo de Buenos Aires.

Infestada experimentalmente (Mazza, 1937).

62. *Triatoma peninsularis* Usinger, 1940. — Mexico.

Tipo no Mus. Calif. Acad. Sci.

63. *Eutriatoma petrochii* (Pinto & Barreto, 1925) Pinto, 1931. — Brasil (Rio Grande do Norte).

Tipo no Instituto Oswaldo Cruz.

64. *Triatoma phyllosoma* (Burmeister, 1835) Del Ponte, 1930. — Mexico, U. S. A.

Tipo?

Infestada em natureza (Mazzotti, 1936, Mexico).

65. *Rhodnius pictipes* Stal, 1872. — Brasil (Amazonas, Mato Grosso e Pará), Colombia, Guiana Francesa, Guiana Inglesa, Venezuela.

Tipo?

Infestada experimentalmente (Castro Ferreira & Deane, 1938).

66. *Triatoma picturata* Usinger, 1939. — Mexico

Tipo no Mus. Calif. Acad. Sci.

Infestada em natureza (Mazzotti, 1939, Mexico).

67. *Cavernicola pilosa* Barber, 1937. — Brasil (Mato Grosso), Panamá.

Tipo no U.S. Nat. Mus., Wash.

68. *Triatoma platensis* Neiva, 1913. — Argentina.

Tipo no Museu Nacional de Buenos Aires.

Infestada em natureza (Mazza, 1936, Argentina) e experimentalmente (Mazza, Basso & Basso, 1936).

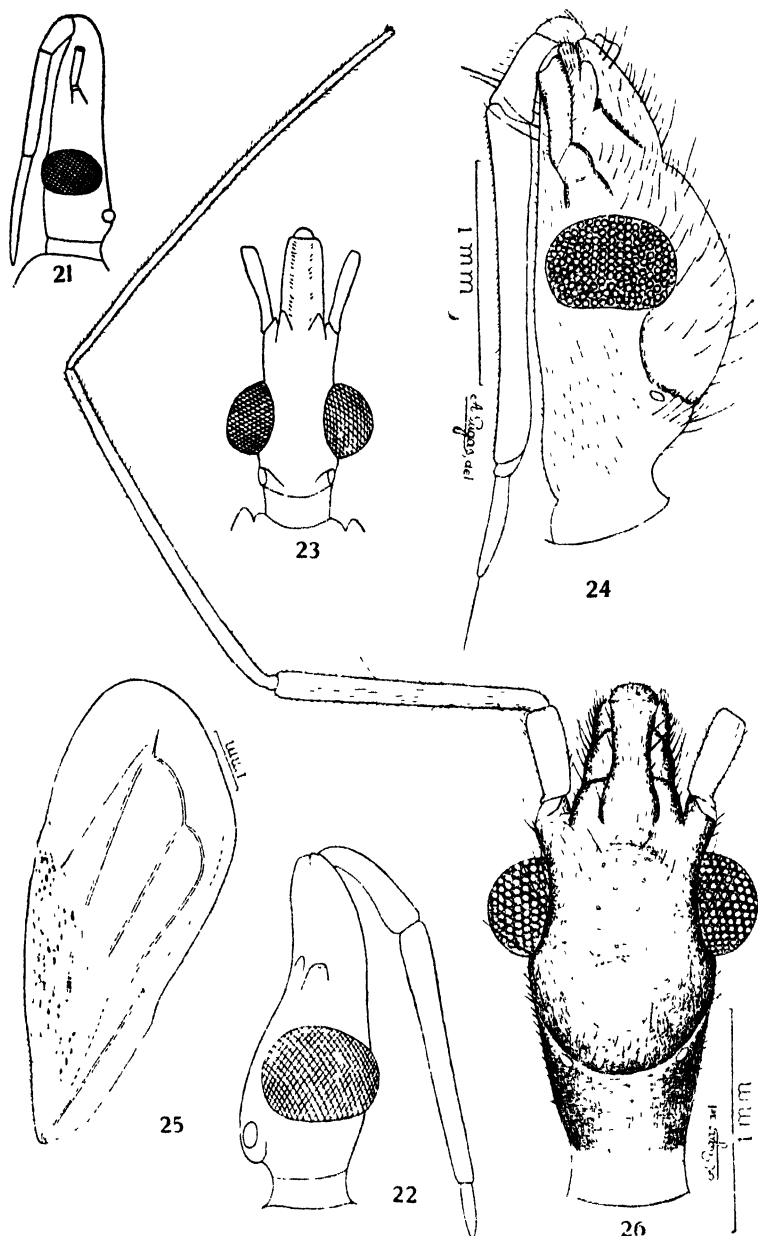


Fig. 21. *Neotriatoma circummaculata* (Stal, 1859); cabeça, vista de perfil. Segundo Pinto, 1931. — Fig. 22. *Eutriatoma tibiamaculata* Pinto, 1926; cabeça, vista de perfil. Segundo Pinto, 1927. — Fig. 23. *Idem*, cabeça, vista dorsal. Segundo Pinto, 1927. — Fig. 24. *Cavernicola pilosa* Barber, 1937; cabeça, vista de perfil. Original. — Fig. 25. *Idem*, hemelítro. Original. — Fig. 26. *Idem*, cabeça, vista dorsal. Original.

69. *Triatoma porteri* Neiva & Lent, 1940. -- Chile.  
Tipo no Instituto Oswaldo Cruz.



Infestada em natureza (Gajardo, 1939, Chile).

70. *Rhodnius prolixus* Stal, 1859. — Brasil (Minas Gerais), Colombia, Guiana Francêsa, Guiana Holandêsa, Guiana Inglêsa, Salvador, Venezuela.

Tipo?

Infestada em natureza (Tejera, 1919, Venezuela, Mexico, Colombia) e experimentalmente (Brumpt & Lugo, 1913).

71. *Triatoma protracta* (Uhler, 1894) Neiva, 1914. — Mexico, U. S. A.

Tipo no U.S. Nat. Mus., Wash.

Infestada em natureza (Kofoid & McCulloch, 1916, U. S. A.) e experimentalmente (Wood, 1934).

72. *Triatoma protracta woodi* Usinger, 1939. — U. S. A.

Tipo no Mus. Calif. Acad. Sci.

73. *Triatoma recurva* (Stal, 1868) Neiva, 1914. — Brasil (sem local).

Tipo no Museu de Stockholm.

74. *Rhodnius robustus* Larrousse, 1927. — Brasil (Amazonas), Guiana Francêsa.

Tipo?

75. *Triatoma rubida* (Uhler, 1894) Neiva, 1914. — Mexico, U. S. A.

Tipo no U.S. Nat. Mus., Wash.

*Eutriatoma sonoriana* Del Ponte, 1930 é denominação dada para *Triatoma mexicana* Neiva, 1912, especie baseada em 3 unicos exemplares femeas provenientes de Presidio de Mazatlan (Mexico) e catalogadas por Champion, em 1899, como *Conorrhinus rubrofasciatus* var.?, dos quais dois exemplares estão depositados no Museu Britânico e um no Instituto Oswaldo Cruz. *Triatoma rubida* (Uhler, 1894) é especie descrita e baseada em poucos exemplares colecionados em Cabo San Lucas, Baixa California (Mexico) pelo Sr. John Xantus, dos quais existe um macho na coleção do Instituto Oswaldo Cruz ofertado pelo proprio Uhler a Neiva e que deve ser um dos exemplares típicos.

Sabemos que Barber identifica *E. sonoriana* a *T. rubida*, opinião que também agora compartilhamos. A semelhança desta especie com *E. uhleri* (Neiva, 1911) é, do mesmo modo, flagrante e só quem dispuzer de material abundante para estudo poderá dar solução definitiva a esta outra possivel identidade.

76. *Triatoma rubrofasciata* (De Geer, 1773) Kirkaldy, 1907. — Açores, Africa Equatorial Francêsa, Andamans (Ilhas), Angola, Antigua, Arabia, Argentina, Borneo, Brasil (Alagôas, Baía, Dis-

trito Federal, Minas Gerais, Pará, Paraíba, Pernambuco, Rio Grande do Norte, S. Paulo e Sergipe), Burma (Rangoon),



Fig. 27. *Dipetalogaster maximus* (Uhler, 1894); contorno do conexivo e margem do abdomen. Original. — Fig. 28. *Idem*, cabeça e torax, vista dorsal. Original.

Carolinas (Ilhas), Ceilão, China, Comoras (Ilhas), Congo, Cuba, Diego Suarez, Estados Malaio, Filipinas, Formosa, Guiana Francêsa, Haiti, Hawaii, Hong-Kong, India, Indochina

Francêsa, Jamaica, Java, Madagascar, Mahé, Mauritia, Nova Guiné, Pondichéry, Reunião, Rodriguez (Ilhas), Salvador, S. Domingos, Serra Leoa, Seychelles, São, Sumatra, União Sul Africana, U. S. A., Venezuela, Virgens (Ilhas), Zanzibar.

Tipo no Naturhistoriska Riksmuseet de Stockholm.

Infestada em natureza (Lucena, 1940, Brasil) e experimentalmente (Neiva, 1914).

Com o nome de *Triatoma evandroi*, o Dr. Alvaro de Figueiredo descreveu, em 1938 exemplares de *T. rubrofasciata* capturados em Zumbi (Recife, Estado de Pernambuco).

Usinger, em 1939, resolve a controvertida questão da existência do *T. rubrofasciata* nos Estados Unidos. O assunto foi objeto de considerações por parte de varios autores e alguns, como Hussey, contestando tal possibilidade, outros, como Neiva, acreditando que a especie devia existir, por ser originaria da India e ter se disseminado pelo trafego marítimo, embora não a tivesse encontrado em 130 exemplares estudados nos varios museus que percorreu; em 1936, Neiva & Lent fazem largos comentarios sobre o assunto. Recentemente Usinger revela a existência da especie em seu país pelo encontro de macho e fema procedentes de «Jacksonville, Florida, April 8, Ac:26226, Collection of Mrs. A. T. Slosson», atualmente nas coleções do American Museum of Natural History

Devido também a gentileza de China que, além do material remetido, escreveu a Lent uma carta relacionando todos os triatomídeos existentes determinados no British Museum, pudemos acrescentar algumas procedências novas para as especies *T. rubrofasciata* e *T. migrans*. Assim, fica evidenciado o que de ha muito suspeitavamos e afirmavamos: a especie em questão é originaria da Asia, e fez a volta ao mundo pois até em Açores é encontrada e estamos certos de que, mais cedo ou mais tarde, sua presença será constatada nos portos do Mediterraneo. O trafego marítimo foi que a difundiu; seu encontro nas Ilhas Rodriguez, do antigo Arquipelago das Mascarenhas, é disso uma confirmação, como aliás no trabalho anterior desenvolvemos.

77. *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843) Pinto, 1931. — Argentina, Brasil (Baía, e Rio Grande do Sul), Chile, Java, Uruguai.

Tipo?

Infestada em natureza (Gaminara, 1923, Uruguai) e experimentalmente (Castro Ferreira & Deane, 1938).

78. *Panstrongylus rufotuberculatus* (Champion, 1899) Pinto, 1931. — Equador, Panamá, Venezuela.

Tipo no British Museum.

Infestada em natureza (Lent & Pifano, 1940, Venezuela).

Recentemente, Lent & Pifano redescrivem a especie estudando exemplares da Venezuela e do Equador. Pela des-

crição que publicaram chegamos, agora, a verificar que *Triatoma coxo-rufa* Campos, 1932 é idêntica à espécie de *Champion*.

79. *Belminus rugulosus* Stal, 1859. — Colombia, Costa Rica, Venezuela.

Tipo depositado no Museu Zoológico de Berlim; perdido, segundo informação prestada pelo Dr. Hans Sachtleben ao Prof. Costa Lima.

80. *Triatoma sanguisuga* (Leconte, 1855) Neiva, 1911. — Panamá, U. S. A.

Tipo?

Infestada experimentalmente (Brumpt, 1914).

*Champion*, em 1899, baseado em *Uhler*, refere a presença da espécie no Panamá, o que espera confirmação. Em 1914, *Neiva* estudou a coleção de hemipteros de *Berg* do Museu de La Plata e nela deparou, com surpresa, um exemplar de *T. sanguisuga* procedente de Missões na Argentina; tal achado precisa, também, confirmação, pois é possível tratar-se de rotulação errada.

81. *Triatoma sanguisuga ambigua* Neiva, 1911. — U. S. A.

Tipo?

Infestada em natureza (*Packchanian*, U. S. A.)

De acordo com nosso critério atual, mantemos agora esta sub-espécie. *Triatoma pinto* Larrousse, 1926 deve ser considerada como sinônimo, opinião, aliás, sustentada por autores norte-americanos, entre eles *Barber*.

82. *Bolboderia scabrosa* Bruner & Fracker, 1926. — Cuba

Tipo?

*Callotriatoma cubana* Usinger, 1939 é sinônimo desta espécie que, por não ter perfeitamente conhecido o aspeto do rosto, não havia sido incluída nas listas de triatomídeos. Esta opinião foi transmitida a *Usinger* por *Lent* em carta de 3/XI/1939 e teve sua aceitação. *Costa Lima* acha possível ser *B. scabrosa* igual a *Belminus rugulosus*.

83. *Panstrongylus scai* (Del Ponte, 1929) Pinto, 1931. — Argentina.

Tipo no Instituto Bacteriológico de Buenos Aires.

84. *Eutriatoma sordida* (Stal, 1859) Pinto, 1931. — Argentina, Bolívia, Brasil (Baía, Goiás, Mato Grosso, Minas Gerais, Pernambuco, Piauí, Rio Grande do Sul, Santa Catarina e S. Paulo), Chile, Uruguai.

Tipo no Kgl. Zool. Mus. de Berlim.

Infestada em natureza (Carini & Maciel, 1914, Brasil) e experimentalmente (Neiva, 1913).

85. *Triatoma spinolai* Porter, 1933. — Chile.

Tipo no Instituto Oswaldo Cruz.

Infestada em natureza (Gajardo, 1939, Chile).

Conforme demonstramos em trabalho anterior, *T. chilena* Usinger, 1939 é sinônimo desta espécie.

86. *Eutriatoma tibiamaculata* Pinto, 1926. — Brasil (Rio de Janeiro e S. Paulo).

Tipo no Instituto Oswaldo Cruz.

87. *Eutriatoma uhleri* (Neiva, 1911) Pinto, 1931. — U. S. A.

Tipo no U. S. Nat. Mus., Wash.

Infestada em natureza (Kofoid & Whitaker, 1936, U. S. A.).

88. *Eutriatoma venosa* (Stal, 1872) Pinto, 1931. — Bolívia, Colômbia, Costa Rica, Equador, Panamá.

Tipo no Naturhistoriska Riksmuseet de Stockholm.

89. *Triatoma vitticeps* (Stal, 1859) Neiva, 1914 — Brasil (Distrito Federal, Espírito Santo, Minas Gerais, e Rio de Janeiro).

Tipo no Museu de Berlim.

Infestada em natureza (Neiva, 1914 — Brasil).

### Lista da distribuição geográfica

1. Açores: *Triatoma rubrofasciata* (De Geer, 1773).
2. África Equatorial Francesa: *Triatoma rubrofasciata* (De Geer, 1773).
3. África Tropical: *Panstrongylus africanus* (Neiva, 1911); *Panstrongylus howardi* (Neiva, 1911).
4. Andamans (Ilhas): *Triatoma rubrofasciata* (De Geer, 1773).
5. Angola: *Triatoma rubrofasciata* (De Geer, 1773).
6. Antígua: *Triatoma rubrofasciata* (De Geer, 1773).
7. Arábia: *Triatoma rubrofasciata* (De Geer, 1773).
8. Argentina: *Triatoma breyeri* Del Ponte, 1929; *Triatoma breyeri dallasi* Del Ponte, 1929; *Neotriatoma circummaculata* (Stal, 1859); *Psammolestes corecides* Bergroth, 1911; *Eratyrus eratyrusiforme* (Del Ponte, 1929); *Panstrongylus geniculatus* (Latreille, 1811); *Panstrongylus guentheri* Berg, 1879; *Triatoma infestans* (Klug in Meyen, 1834); *Panstrongylus larroussei* (Pinto, 1925); *Neotriatoma ilmai* (Del Ponte, 1929); *Triatoma mazzai* Jörg, 1937; *Eutriatoma oswaldoi* (Neiva & Pinto, 1923); *Triatoma patagonica* Del Ponte, 1929; *Triatoma platensis* Neiva, 1913; *Triatoma rubrofasciata* (De Geer, 1773); *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843); *Pan-*

*strongylus seai* (Del Ponte, 1929); *Eutriatoma sordida* (Stal, 1859).

9. Bolívia: *Triatoma infestans* (Klug in Meyen, 1834); *Eutriatoma sordida* (Stal, 1859); *Eutriatoma venosa* (Stal, 1872).

10. Borneo: *Triatoma migrans* Breddin, 1903; *Triatoma rubrofasciata* (De Geer, 1773).

#### 11. Brasil:

Acre (Território do): Não existem espécies referidas.

Alagoas: *Triatoma rubrofasciata* (De Geer, 1773).

Amazonas: *Rhodnius brethesi* Matta, 1919; *Panstrongylus geniculatus* (Latreille 1811); *Rhodnius pictipes* Stal, 1872; *Rhodnius robustus* Larrousse, 1927.

Baía: *Triatoma brasiliensis* Neiva, 1911; *Panstrongylus geniculatus* (Latreille, 1811); *Triatoma infestans* (Klug in Meyen, 1834); *Panstrongylus lutzi* (Neiva & Pinto, 1923); *Eutriatoma maculata* (Erichson, 1848); *Panstrongylus megistus* (Burmeister, 1835); *Triatoma melanocephala* Neiva & Pinto, 1923 *Triatoma rubrofasciata* (De Geer, 1773); *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843); *Eutriatoma sordida* (Stal, 1859).

Ceará: *Triatoma brasiliensis* Neiva, 1911; *Rhodnius brumpti* Pinto, 1925; *Psammolestes coreodes* Bergroth, 1911; *Panstrongylus lutzi* (Neiva & Pinto, 1923); *Eutriatoma maculata* (Erichson, 1848); *Panstrongylus megistus* (Burmeister, 1835), *Rhodnius nasutus* Stal, 1859

Distrito Federal: *Panstrongylus geniculatus* (Latreille, 1811); *Eutriatoma oswaldoi* (Neiva & Pinto, 1923); *Triatoma rubrofasciata* (De Geer, 1773); *Triatoma vitticeps* (Stal, 1859).

Espírito Santo: *Panstrongylus megistus* (Burmeister, 1835); *Triatoma vitticeps* (Stal, 1859).

Goiás: *Panstrongylus megistus* (Burmeister, 1835); *Eutriatoma sordida* (Stal, 1859).

Maranhão: *Panstrongylus geniculatus* (Latreille, 1811).

Mato Grosso: *Psammolestes coreodes* Bergroth, 1911; *Panstrongylus megistus* (Burmeister, 1835); *Rhodnius pictipes* Stal, 1872; *Cavernicola pilosa* Barber, 1937; *Eutriatoma sordida* (Stal 1859).

Minas Gerais: *Triatoma arthurneivai* Lent & Martins, 1940; *Triatoma brasiliensis* Neiva, 1911; *Triatoma brasiliensis melanica* Neiva & Lent, n. subsp.; *Triatoma Chagasi* Brumpt & Gomes, 1914; *Psammolestes coreodes* Bergroth, 1911; *Panstrongylus geniculatus* (Latreille, 1811); *Triatoma infestans* (Klug in Meyen, 1834); *Eutriatoma maculata* (Erichson, 1848); *Panstrongylus megistus* (Burmeister, 1835); *Rhodnius prolixus* Stal, 1859; *Triatoma rubrofasciata* (De Geer, 1773); *Eutriatoma sordida* (Stal, 1859); *Triatoma vitticeps* (Stal, 1859).

Pará: *Panstrongylus geniculatus* (Latreille, 1811); *Panstrongylus lignarius* (Walker, 1873); *Eratyrus mucronatus* Stal, 1859; *Rhodnius pictipes* Stal, 1872; *Triatoma rubrofasciata* (De Geer, 1773).

Paraíba: *Panstrongylus lutzi* (Neiva & Pinto, 1923); *Eutriatoma maculata* (Erichson, 1848); *Triatoma rubrofasciata* (De Geer, 1773).

Paraná: *Triatoma infestans* (Klug in Meyen, 1834); *Panstrongylus megistus* (Burmeister, 1835).

Pernambuco: *Triatoma brasiliensis* Neiva, 1911; *Psam-*

*molestes coreodes* Bergroth, 1911; *Eutriatoma maculata* (Erichson, 1848); *Panstrongylus megistus* (Burmeister, 1835); *Triatoma melanocephala* Neiva & Pinto, 1923; *Triatoma rubrofasciata* (De Geer, 1773); *Eutriatoma sordida* Stal, 1859).

Piauí: *Triatoma brasiliensis* Neiva, 1911; *Eutriatoma maculata* (Erichson, 1848); *Panstrongylus megistus* (Burmeister, 1835); *Eutriatoma sordida* (Stal, 1859).

Rio Grande do Norte: *Triatoma brasiliensis* Neiva, 1911; *Rhodnius brumpti* Pinto, 1925; *Panstrongylus lutzi* (Neiva & Pinto, 1923); *Eutriatoma maculata* (Erichson, 1848); *Eutriatoma petrochii* (Pinto & Barreto, 1925); *Triatoma rubrofasciata* (De Geer, 1773)

Rio Grande do Sul: *Eutriatoma gomesi* (Neiva & Pinto, 1923); *Triatoma infestans* (Klug in Meyen, 1834); *Panstrongylus megistus* (Burmeister, 1835); *Eutriatoma oliveirai* Neiva, Pinto & Lent, 1939; *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843); *Eutriatoma sordida* (Stal, 1859)

Rio de Janeiro: *Rhodnius domesticus* Neiva & Pinto, 1923; *Panstrongylus geniculatus* (Latreille, 1811); *Panstrongylus megistus* (Burmeister, 1835); *Eutriatoma tibiamaculata* Pinto, 1926; *Triatoma vitticeps* (Stal, 1859).

Santa Catarina: *Panstrongylus megistus* (Burmeister, 1835); *Eutriatoma sordida* (Stal, 1859)

São Paulo: *Rhodnius domesticus* Neiva & Pinto, 1923; *Panstrongylus geniculatus* (Latreille, 1811); *Triatoma infestans* (Klug in Meyen, 1834); *Panstrongylus megistus* (Burmeister, 1835); *Triatoma rubrofasciata* (De Geer, 1773); *Eutriatoma sordida* (Stal, 1859); *Eutriatoma tibiamaculata* Pinto, 1926.

Sergipe: *Triatoma rubrofasciata* (De Geer, 1773).

Sem referencia de Estado: *Neotriatoma limai* (Del Ponte, 1929). *Triatoma recurva* (Stal, 1868).

12. Buíra (Rangoon): *Triatoma rubrofasciata* (De Geer, 1773)

13. Carolinas (Ilhas): *Triatoma rubrofasciata* (De Geer, 1773).

14. Ceilão: *Triatoma rubrofasciata* (De Geer, 1773)

15. Chile: *Triatoma infestans* (Klug in Meyen, 1834); *Triatomaptera porteri* Neiva & Lent, 1940; *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843); *Eutriatoma sordida* (Stal, 1859); *Triatoma spinolai* Porter, 1933.

16. China: *Triatoma rubrofasciata* (De Geer, 1773).

17. Colombia: *Eratyrus cuspidatus* Stal, 1859; *Panstrongylus geniculatus* (Latreille, 1811); *Rhodnius pictipes* Stal, 1872; *Rhodnius prolixus* Stal, 1859; *Belminus rugulosus* Stal, 1859; *Eutriatoma venosa* (Stal, 1872)

18. Comoras (Ilhas): *Triatoma rubrofasciata* (De Geer, 1773).

19. Congo: *Triatoma rubrofasciata* (De Geer, 1773).

20. Costa Rica: *Triatoma dimidiata* (Latreille, 1811); *Belminus rugulosus* Stal, 1859; *Eutriatoma venosa* (Stal, 1872).

21. Cuba: *Eutriatoma flavida* (Neiva, 1911); *Triatoma rubrofasciata* (De Geer, 1773); *Bolboderia scabrosa* Bruner & Fracker, 1926.

22. Diogo Suarez: *Triatoma rubrofasciata* (De Geer, 1773).

23. Equador: *Eutriatoma carrioni* (Larrousse, 1926); *Triatoma dimidiata* (Latreille, 1811); *Panstrongylus rufotuberculatus* (Champion, 1899); *Eutriatoma venosa* (Stal, 1872).

24. Estados Malaio: *Triatoma migrans* Breddin, 1903; *Triatoma rubrofasciata* (De Geer, 1773).

25. Filipinas: *Triatoma rubrofasciata* (De Geer, 1773).

26. Formosa: *Triatoma rubrofasciata* (De Geer, 1773).

27. Guatemala: *Triatoma dimidiata* (Latreille, 1811); *Triatoma nitida* Usinger, 1939.

28. Guiana Francêsa: *Panstrongylus geniculatus* (Latreille, 1811); *Rhodnius pictipes* Stal, 1872; *Rhodnius prolixus* Stal, 1859; *Rhodnius robustus* Larrousse, 1927; *Triatoma rubrofasciata* (De Geer, 1773).

29. Guiana Holandêsa: *Panstrongylus geniculatus* (Latreille, 1811); *Eutriatoma maculata* (Erichson, 1848); *Rhodnius prolixus* Stal, 1859.

30. Guiana Inglêsa: *Panstrongylus geniculatus* (Latreille, 1811); *Panstrongylus lignarius* (Walker, 1873); *Eutriatoma maculata* (Erichson, 1848); *Panstrongylus megistus* (Burmeister, 1835); *Eratyrus mucronatus* Stal, 1859; *Rhodnius pictipes* Stal, 1872; *Rhodnius prolixus* Stal, 1859.

31. Haiti: *Triatoma rubrofasciata* (De Geer, 1773).

32. Hawaii: *Triatoma rubrofasciata* (De Geer, 1773).

33. Honduras: *Triatoma dimidiata* (Latreille, 1811); *Triatoma nitida* Usinger, 1939.

34. Hong Kong: *Triatoma rubrofasciata* (De Geer, 1773).

35. Índia: *Li shosteus carnife* Distant, 1904; *Triatoma rubrofasciata* (De Geer, 1773).

36. Indochina Francêsa: *Panstrongylus bouvieri* (Larrousse, 1924); *Triatoma rubrofasciata* (De Geer, 1773).

37. Jamaica: *Triatoma rubrofasciata* (De Geer, 1773).

38. Java: *Triatoma migrans* Breddin, 1903; *Triatoma rubrofasciata* (De Geer, 1773); *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843).

39. Madagascar: *Triatoma rubrofasciata* (De Geer, 1773).

40. Mahé: *Triatoma rubrofasciata* (De Geer, 1773).

41. Maurítia: *Triatoma rubrofasciata* (De Geer, 1773).

42. México: *Triatoma barberi* Usinger, 1939; *Triatoma dimidiata* (Latreille, 1811); *Triatoma dimidiata maculipennis* (Stal, 1859); *Triatoma gerstaeckeri* (Stal, 1859); *Triatoma hegneri* Mazzotti, 1940; *Triatoma incrassata* Usinger, 1939; *Triatoma longipennis* Usinger, 1939; *Triatoma longipes* Barber, 1937; *Dipetalogaster maximus* (Uhler, 1894); *Triatoma mexicana* (H. Schaeffer, 1848); *Triatoma pallidipennis* (Stal, 1872); *Triatoma peninsularis* Usinger, 1940; *Triatoma phyllosoma* (Burmeister, 1835); *Triatoma picturata* Usinger, 1939; *Triatoma protracta* (Uhler, 1894); *Triatoma rubida* (Uhler, 1894).

43. Nicarágua: *Triatoma dimidiata* (Latreille, 1811); *Triatoma dimidiata maculipennis* (Stal, 1859).

44. Nova Guiné: *Triatoma leopoldi* (Schouteden, 1933); *Triatoma rubrofasciata* (De Geer, 1773).



45. Panamá: *Eratyrus cuspidatus* Stal, 1859; *Triatoma dimidiata* (Latreille, 1811); *Panstrongylus geniculatus* (Latreille, 1811); *Panstrongylus humeralis* (Usinger, 1939); *Rhodnius pallescens* Barber, 1932; *Cavernicola pilosa* Barber, 1937; *Panstrongylus rufotuberculatus* (Champion, 1899); *Triatoma sanguisuga* (Leconte, 1855); *Eutriatoma venosa* (Stal, 1872).

46. Paraguai: *Panstrongylus geniculatus* (Latreille, 1811); *Triatoma infestans* (Klug in Meyen, 1834); *Panstrongylus megistus* (Burmeister, 1835).

47. Perú: *Panstrongylus chinai* (Del Ponte, 1929); *Triatoma dimidiata* (Latreille, 1811); *Panstrongylus geniculatus* (Latreille, 1811); *Triatoma infestans* (Klug in Meyen, 1834); *Eutriatoma oswaldoi* (Neiva & Pinto, 1923).

48. Pondichéry: *Triatoma rubrofasciata* (De Geer, 1773).

49. Reunião: *Triatoma rubrofasciata* (De Geer, 1773).

50. Rodriguez (Ilhas): *Triatoma rubrofasciata* (De Geer, 1773).

51. Salvador: *Triatoma dimidiata* (Latreille, 1811); *Triatoma dimidiata maculipennis* (Stal, 1859); *Rhodnius prolixus* Stal, 1859; *Triatoma rubrofasciata* (De Geer, 1773).

52. São Domingos: *Triatoma rubrofasciata* (De Geer, 1773).

53. Serra Leoa: *Triatoma rubrofasciata* (De Geer, 1773).

54. Seychelles: *Triatoma rubrofasciata* (De Geer, 1773).

55. Sião: *Triatoma rubrofasciata* (De Geer, 1773).

56. Sumatra: *Triatoma migrans* Breddin, 1903; *Triatoma rubrofasciata* (De Geer, 1773).

57. Trinidad: *Triatoma rubrofasciata* (De Geer, 1773).

58. União Sul Africana: *Triatoma rubrofasciata* (De Geer, 1773).

59. Uruguai: *Neotriatoma circummaculata* (Stal, 1859); *Panstrongylus geniculatus* (Latreille, 1811); *Triatoma infestans* (Klug in Meyen, 1834); *Eutriatoma sordida* (Stal, 1859); *Eutriatoma rubrovaria* (Blanchard in Blanchard & Brullé, 1843).

60. U. S. A.: *Triatoma gerstaeckeri* (Stal, 1859); *Triatoma heidemanni* Neiva, 1911; *Paratriatoma hirsuta* Barber, 1938; *Triatoma indictiva* Neiva, 1912; *Triatoma longipes* Barber, 1937; *Dipetalogaster maximus* (Uhler, 1894); *Triatoma neotomae* Neiva, 1911; *Triatoma occulta* Neiva, 1911; *Triatoma ocellata* Neiva, 1911; *Triatoma phyllosoma* (Burmeister, 1835); *Triatoma protracta* (Uhler, 1894); *Triatoma protracta woodi* Usinger, 1939; *Triatoma rubida* (Uhler, 1894); *Triatoma rubrofasciata* (De Geer, 1773); *Triatoma sanguisuga* (Leconte 1855); *Triatoma sanguisuga ambigua* Neiva, 1911; *Eutriatoma uhleri* (Neiva, 1911).

61. Venezuela: *Psammolestes arthuri* (Pinto, 1926); *Eratyrus cuspidatus* Stal, 1859; *Triatoma dimidiata* (Latreille, 1811); *Panstrongylus geniculatus* (Latreille, 1811); *Eutriatoma maculata* (Erichson, 1848); *Eutriatoma nigromaculata* (Stal, 1872); *Rhodnius pictipes* Stal, 1872; *Rhodnius prolixus* Stal, 1859; *Triatoma rubrofasciata* (De Geer, 1773); *Panstrongylus rufotuberculatus* (Champion, 1899); *Belminus rugulosus* Stal, 1859.

62. Virgens (Ilhas): *Triatoma rubrofasciata* (De Geer, 1773).

63. Zanzibar: *Triatoma rubrofasciata* (De Geer, 1773).

**The biology of the fungus-growing ants. Part VII. The Barro Colorado Island, Canal Zone, species**

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(With 14 plates)

Barro Colorado Island is situated in the Panama Canal and represents high land (maximum elevation 537 feet above sea level) not flooded in the formation of Gatun Lake through which the Canal passes. It is consequently an artificial island and has no insular characteristics so far as the ant fauna is concerned. Barro Colorado Island is covered almost completely by luxuriant Central American rain forest and has an annual rainfall of about 110 inches. Though having an area of but approximately six square miles the ant fauna is exceedingly rich. It has very likely as many species of ants as any region of similar area in the world. Thanks largely to the foresight and initiative of Thomas Barbour and James Zetek, and the men they have interested, it is to be kept as nearly as possible in a primitive state.

Probably more biological research has been and is being conducted on this island than at any other place in the Tropics of either hemisphere. Eventually it will be possible to give a complete picture of tropical life from these investigations. The following study, based upon very brief and hurried personal observations, is the first to be made here upon fungus-growing ants as a group. More complete studies are much to be desired in view of the general scientific and economic importance of these animals which live in an unusual symbiosis with primitive plants.

Barro Colorado Island is well provided with Attini. Dr. W. M. Wheeler, who spent the summer of 1924 on the island, recognized (1925) 14 species of 7 genera though without identifying more than a new species of *Sericomyrmex* (*S. amabilis*). Later he identified *Atta cephalotes polita* (Lutz, 1929) and *Acromyrmex octospinosus echinator* (Wheeler, 1937). During several weeks in June and a few days in August 1938 I was able to make hasty observations and collections of attine ants on the island. In the collections I have identified 21 species and subspecies of eight genera. For an island of only six square miles, this is a considerable variety which can probably not be surpassed anywhere in a

similar area of rain forest. Twelve species and subspecies are new to science, including two which I described from Dr. Wheeler's collection (1938b). Since many attines are local and rare it is probable that these are by no means all to be found on the island. By comparison, the 1,750 square mile island of Trinidad, B.W.I. contains 27 species and subspecies of 9 genera, the single genus not found on Barro Colorado being *Mycetophylax* which, in the Caribbean, seems to live exclusively on the seashore and would therefore not be expected on Barro Colorado. On the largest island in the Neotropical Region, Cuba, only five species, each of a different genus, are known. I have recorded (1938b) 49 species and subspecies of 10 genera and subgenera from Bolivia, the largest number from any country so far published, though Brazil, because of its tremendous area and varied habitats, should have more.

The variety of attines found on Barro Colorado would be still larger if it were not covered uniformly by rain forest. The small clearing below the laboratory does not present true savannah conditions so far as attines are concerned. On the grassy Plaza de Lesseps in Panama City, for instance, is found *Atta sexdens*, a species not found on the island, and the subgenus *Moellerius* of *Acromyrmex* comprises another savannah group of species.

On the other hand, *Atta columbica tonsipes* and *A. cephalotes isthmicola* which are found in the rain forest of the island, are also found in savannah regions, the former in the west savannah near Juan Diaz, Republic of Panama, and the latter, or a closely related form, on the open slopes of the Cordillera Central of Colombia (Medellín, 5800 ft.; Rio Porce, 3250-3500 ft.).

The majority of the species on the island, however, are probably strictly rain forest species. The species of *Apterostigma*, for instance, require a habitat which has a uniformly high humidity since their nests are usually in places which could quickly dry out and the fungus grown by them is very delicate. Those species of *Trachymyrmex*, *Sericomyrmex*, *Myrmicocrypta* and *Mycoccepurus* which are found on Barro Colorado doubtless require similar conditions of consistently high humidity though unfortunately only two of the species have so far been reported elsewhere. It is quite possible that some of the soil-inhabiting species may be more adaptable.

An example is *Trachymyrmex urichi* which in Trinidad nests not only in the rain forests of the northern Range and the Nariva Swamp but also on the Piarco Savannah of that island and the llanos north of Ciudad Bolivar in Venezuela. In such adaptability it resembles *Cyphomyrmex rimosus*, *Acromyrmex* and the *Attas* above mentioned. The new *Cyphomyrmex acutus* is undoubtedly a strictly rain forest species.

The affinities of the attine fauna seem to be largely Central American as would be expected though the distribution of a very few attines is even imperfectly known, the majority of species being recorded from the original single collections. *Cyphomyrmex costatus* and *Myrmicocrypta ednaella*, hitherto known only from Honduras, are represented on Barro Colorado. *Apterostigma collare*, *A. dubium*, and *A. angulatum* are common to Costa Rica and the island. On the other hand, the above mentioned species of *Atta*, *Cyphomyrmex rimosus* and *Apterostigma mayri* are common to both Central and Northern South America. *Cyphomyrmex costatus* has as its congener in neighboring Colombia (Rio Porce) a closely related new species, *C. colombanus* (Weber, 1940).

The typical situation for an attine nest is in the soil in shade. The smaller species habitually nest in one or more cells, the upper cell occasionally being against a partially imbedded stone or piece of wood, but in most species it is a few centimeters down in the soil. Some species suspend the fungus garden from the ceiling of stone, wood or soil; others use roots penetrating the cell for a support for the fragile garden. Nests of attines on Barro Colorado are noticeably more abundant on the clay ridges radiating down from the highest point of the island. The soil drains freely down the slopes and the forest is not so dense as to drive out the animals and plants upon which the attines directly or indirectly depend. In the densest tropical forests life is appreciably scarcer than in forests with moderate light. The ants of the species *Cyphomyrmex rimosus* and its numerous subspecies are about two millimeters in length and the colonies consist usually of about a hundred adults. These small ants frequently nest in humus about the roots of epiphytes or under the bark of living or dead trees, sometimes several feet from the ground. The highest nest found seems to be one at an elevation of 92 feet on a *Cassia* tree which was itself 180 feet tall that I examined in British Guiana. The larger ants

of the genus *Apterostigma* form smaller colonies and these may be found among humus or in decayed wood several feet above ground. The *Myrmicocrypta* and *Mycocepurus* on the island are terrestrial though a single species of *Myrmicocrypta*, *M. spinosa* (Weber, 1937, p. 383) has been found in a tree several feet above ground.

The external indication of the nest of the small species, except those of *Cyphomyrmex*, is usually a small crater several centimeters in diameter. The crater is often erected in the form of a friable turret in *Myrmicocrypta*, *Mycocypurus*, and *Trachymyrmex* but this is easily demolished by a shower. A short tunnel leads to a cell whose size varies with the species, an average being the size of an orange. In some species a second cell may be beneath the first and there may be still others. The commonest attine, *Cyphomyrmex rimosus*, produces no external indication to the nest and appears to occupy previously existing cavities in the soil or wood. A frequent situation for *rimosus* is inside a curled-up decayed leaf buried in the debris of the forest floor and I found one nest in a dead snail shell on the forest floor in Cuba. The crater formed by colonies of the larger *Trachymyrmex* species and by *Sericomyrmex amabilis* is in the neighborhood of ten centimeters in diameter though often washed away by rains. The colonies of the two species of *Atta* on the island form the conspicuous multiple crater nests, the largest found (R. C. Shannon trail just beyond no. 11 post) (Plate 14) having an uphill diameter of 10.5 meters and a lateral diameter of six meters. Numerous cells 15-25 cm. in diameter and at different levels extend over a large area beneath the craters. The *Attas* have broad, well-cleaned highways extending sometimes hundreds of feet through the forest to favored plants.

The fungus garden in all species except *Cyphomyrmex rimosus* is composed of pellets of substrate loosely held together by hyphae and is friable and spongy, with a volume only slightly less than that of the chamber in which it is formed. The fungus consists only of the hyphae in mycelial masses together with special hyphal aggregations known as bromatia. Fruiting stages and spores have never been recorded except in a few cases (Weber 1939a).

*Cyphomyrmex rimosus* and its numerous subspecies develop a unique fungus garden of cheese-like masses, also

called bromatia, a fraction of a millimeter in diameter, upon insect feces, frequently caterpillar. The bromatia are grayish or amber in color and grow directly from the moist substrate. In feeding, the ants pick up such a bromatium with their mandibles and rotate it between the mouth parts with the aid of the fore feet. As it is rotated the tongue abrades the mass and the juices are absorbed. A bromatium not completely eaten at one meal is re-imbedded in the substrate and grows back to normal size. A bromatium frequently is eaten *in situ*. New bromatia appear to form by budding off from larger ones. Because of the treatment given the bromatia no conspicuous mycelial growth forms on the substrate. Larvae and pupae, however, are frequently covered with the mycelium from time to time. Brood is kept away from the fungus garden in a separate cell or part of the same chamber.

In the *Apterostigma* colony the fungus is grown upon wood-boring beetle feces, other insect feces, and upon slivers of decayed wood and other vegetal debris. The fungus grows over the loose mass of such substrate and, if the nest is suspended, the addition of new substrate usually results in the formation of loose, stringy masses held together by the mycelium. In several species the peripheral mycelium grows as a silk-like envelope about the entire mass. Feeding is essentially as described above. In the loose cells of the substrate, the brood is reared.

The fungus garden of all other attines on the island is remarkably uniform considering the variation in size, structure and nesting habits of the ants. The garden is grayish on the outside due to the appearance of the mycelium against the discolored substrate. Inside, the garden is buff, light brown, or grayish-brown in color and is mostly substrate with a scanty mycelial growth covering the pellets and lining the irregular cells or cavities when these are present. In the smallest nests, those of *Cyphomyrmex costatus*, the fungus garden is quite uniformly grayish and much drier than the moist gardens of most of the other species. Bromatia stud the outside and also the lining of the cells. These are the food of the ants and the manner of feeding is similar to that in *Cyphomyrmex rimosus*, the ants manipulating the bromatium between the mouthparts and legs and abrading the surface so that the juices may be absorbed. The substrate in the smaller species is a miscellany of vegetal origin,

slivers of wood, pieces of decomposing wood, fresh-flower sections, insect feces and even insect skeletons. The latter must be used only as a framework. These particles are manured with the ant's liquid excrement, the latter probably contributing an important part of the proteins and other foods necessary to the metabolism of the fungus. The workers of *Atta* and *Acromyrmex* are the leaf-cutters of the tribe and it is this activity which is of importance to agriculture since economically important plants such as citrus and cassava are often stripped of leaves by the ants. They are also a nuisance to gardens, since they readily take the leaves and flowers of exotic plants in general. The leaf sections are broken up into smaller pieces which are bitten repeatedly so as to be reduced to a pulpy mass and are then manured before being imbedded in the garden. As in *Apterostigma*, the brood is kept in the loose cells of the garden, the larvae and pupae frequently being covered with a mycelium.

Fungus-growing ants are often nocturnal as well as diurnal in their activities outside the nest. The large *Attas* may cut leaves and excavate during much of the night. The workers of smaller genera are occasionally seen slowly foraging at night for substrate or bringing up soil particles as they enlarge the nest.

An unexpected and unrecorded habit of an attine, *Srachymyrmex isthmicus*, was observed during my visit to the island. A colony of this species moved their fungus garden and brood, piece by piece, from one site, evidently flooded by torrential rains, to a higher site 52 cm. away on the slope of a clay ridge. The house-and-family-moving started on a rainless, sunshiny day after a week of rain and was finished two days later. Slightly over two loads per minute were taken from the old site to the new. Probably about ten thousand trips were necessary.

Barro Colorado is the home of the guest ant, *Megalomyrmex symmetochus*, living in the nest of *Sericomyrmex amabilis* which was discovered by Dr. W. M. Wheeler in 1924. In addition to rediscovering this association I was fortunate in finding another guest ant, a new species of *Megalomyrmex* (*M. wheeleri*) living with an entirely different fungus-grower, *Cyphomyrmex costatus*. Each guest ant develops colonies which live in the fungus-garden of the host or in a small chamber beside it. The guest feeds upon

the fungus grown by the host. Not only is there complete toleration between the two species but on occasion a worker of one will clean the brood of the other by meticulous licking, as is customary among ants. These are the only guest ants of attines known.

## II. Observations on individual species

### *Cyphomyrmex rimosus* Spinola (Plate 1)

This species stands at the bottom of the long series of fungus-growing ants. If the Attini are derived from the Dacetoniini, as has been accepted by Forel, Emery and Wheeler, this species above all resembles the average species of the parent tribe. In numbers of individuals in the colony, in nesting sites in humus, soil or decayed wood, in slow-moving habit, becoming motionless at the least disturbance, it is a typical dacetonine. Other attine species of several genera are similar in these characteristics but this species is distinct in possessing the squamate hairs and feeble or no spinosity of many Dacetoniini, especially *Strumigenys* and *Rhopalothrix*, the latter having especially similar compact habitus and mandibles. Yet in the dacetonine *Orectognathus antennatus* F. Smith of New Zealand, and related species, of a genus not known from the New World, the arrangement of thoracic and petiolar ridges and tubercles resembles closely the arrangement of ridges and spines in *Mycocepurus smithi* Forel. It is therefore possible that the fungus-growing habit has been acquired independently by these and perhaps other attine genera.

*C. rimosus* is the most widely distributed of all attine species, having almost exactly the range of the entire tribe but not recorded quite as far north in the United States, evidently being confined for the most part to the Gulf of Mexico coast.

The species is highly variable and a number of subspecies and varieties have been described. Some will probably prove on detailed study to be not valid. Such a form may be *C. rimosus* var. *major* Forel, of which Forel (1912, p. 188) writes, in identifying workers from Sorocaba, Prov. São Paulo, Brazil, as this form: «Le type de la variété est de Guatémala, mais identique». All forms have probably similar habits



though nothing is known regarding the habits of most of them.

*C. rimosus* and its numerous forms are unique among Attini in that they grow a fungus lacking hyphae and in the form of small, irregularly polygonal masses, «bromatia», of about a half-millimeter in diameter. The substrate is usually caterpillar or beetle feces. The color of the bromatia varies from dirty gray to a rich, though pale, brown. Wheeler (1907, p. 772) has named this fungus *Tyridiomyces formicarum*

Pará, Brazil, is the type locality of *rimosus* and the species was described by Spinola in 1851. According to Wheeler (1907, p. 719) the typical form «appears to be confined to northern South America and the adjacent mainland of Central America and Mexico.» The variety *minutus* Mayr, described in 1862 from Cuba, was believed to be «confined to the West Indies and adjacent shores of North and South America» (*loc. cit.*, p. 722). The ranges, therefore, are confusingly similar and while both were supposed to occur in the Americas, only *minutus* was supposed to occur in the West Indies. Forel also recorded only *minutus* from the West Indies. I have, however, collected in Cuba, Nevis, Dominica, Martinique, St. Vincent, St. Lucia, Haiti and Trinidad upon various occasions, ants identical with the common mainland form. The name *minutus* would lead one to believe that the so-called West Indian form would be smaller. Actually, the size given by Mayr for the type specimen is 2.5 mm., that of a large form, while the typical *rimosus* was recorded by Spinola as only 2 mm. long. My West Indian specimens agree with Mayr's in size.

From the above considerations it seems probable that *minutus* is a synonym and I am so considering it. It is possible, of course, that the typical *rimosus* has not been correctly identified and is an unrecognized small form, in which case *minutus* would become the most widespread and common form of the species.

*Cyphomyrmex rimosus* is distributed generally over Barro Colorado and is to be found under logs and stones, between decayed leaves and in similar places which maintain a uniformly high humidity and fairly constant temperature. Such conditions may be met in trees. Near the Mazaruni River, British Guiana, I found a flourishing colony in the tangled

mass of roots and humus at the base of a giant aroid at an elevation of 92 feet on a 180-foot *Cassia* tree. On the xerophytic island of Patos, between Trinidad and Venezuela, other colonies were found nesting in the humus lodged at the bases of six-foot tall bromeliads growing from the ground. In the latter instance the nests were kept moist by frequent clouds passing over the xerophytic forest. In similar situations on Barro Colorado this species undoubtedly will be found.

A nest of this species, under a small flattened stone ( $23 \times 12 \times 12$  mm.), occurred close to a nest of the new subspecies *breviscapus*, the latter under a small piece of termite-ridden wood contiguous to the stone under lime trees in the laboratory clearing. Aside from one being under a small stone, the other under a small piece of wood their habitat appeared identical since both were in irregular chambers in reddish clay soil. When the nests were exposed, workers of *Ectatomma ruidum* Roger and a small black *Pheidole* invaded them and ran off with brood. Both colonies had brood in one set of galleries and the fungus garden on insect feces in other galleries. As in other nests of *rimosus* the brood is often kept in the higher galleries next to the covering wood or stone where the temperature may become somewhat higher in mid-day and thus speed the time of development.

The usual nest of *rimosus* and its forms contains several score to around one hundred workers with one or several queens. Wheeler (1907, p. 769) records colonies of *C. rimosus comalensis* Wheeler in Texas «comprising a hundred or more workers and from one to three dealated queens.» From the type nest of *C. rimosus venezuelensis* Weber in Venezuela 175 workers were taken. From the type nest of *C. rimosus curiapensis* Weber, also in Venezuela, 90 workers, 7 males and 5 winged females were taken. Unfortunately lack of time prevented the thorough collecting of each colony from their ramifying chambers in humus and no queens were taken. These subspecies are known only from the original collections. The populations of the colonies of the other forms of *rimosus* are not recorded but are probably similar to those above.

What impressed me at the time as one of the largest colonies I ever saw and one with the largest number of queens was a colony found across the bay from Panama

City, R. P., June 16, 1938, 174 workers and 44 dealate queens were collected, a proportion of only four workers to each queen. If we suppose 10% of the workers and one or two queens to have been overlooked, a likely possibility considering those workers probably foraging, their well-known nearly invisible habitus in nature when disturbed, and the haste with which this colony had to be collected, the numbers would be 191 and 46 respectively, a ratio the same 4 : 1.

No ant colony known to me from the literature or from personal collecting had any such high proportion of queens to workers. The type colony of *Trachymex ruthae* Weber in Trinidad had 280 workers, 23 dealate queens, 7 alate females and 23 males. This colony therefore had a ratio of about 12 : 1 for workers and queens but probably some of these latter were alate forms which lost their wings shortly after the colony was collected. For a possible explanation of the high proportion, the ecology of the Panama colony may well be considered.

The nest was in a section of a rotted twig 2.5 cm. in diameter and 13 cm. long which was lying on the sandy beach in the shade of bull's horn acacia (*A. costaricensis* Schenck), mesquite (*Prosopis chilensis*), manchineel (*Hippomane*) and other plants just above high tide level. The twig was on the bare sand some centimeters from other debris. Irregular chambers under the papery bark, probably tunneled by wood-boring beetles, were occupied by the colony. Brood was kept in some of the chambers, the fungus garden in others. At this time, late, sunny morning, workers were carrying in beetle feces, not caterpillar. It was necessary for them to forage back under the bushes since to the south and west stretched a short beach, then the bay. At this time the rainy season was in full swing and the previous month was one of record rainfall with several rains every day. The prevailing winds would come from the north or east and thus blow from the mainland towards the bay. The colony probably had produced a brood of winged females and males which became adult at the onset of the rainy season. Heavy and continuous rains with winds driving seawards may have prevented some females from leaving the nest, others may have come down from their marriage flight to the barren beach. The result may have been the adoption of some of

these females, fecundated or not, into the colony and the consequent high proportion of females.

*Cyphomyrmex rimosus* Spinola ssp. *breviscapus*  
Weber

This subspecies is readily told in the field from the typical *rimosus* by its paler color and smaller size. Some workers, however, may be almost as dark. Under the microscope the shorter antennal scapes serve to identify it.

It is probably of general distribution on the island. Stray workers were found in debris on top of a large fallen tree as well as under a small rotted log on the ground. One colony was nesting in a knothole in a rotted log on the ground in dense shade on a steep slope. Another, found in a very wet and friable rotted piece of wood on the ground, had the brood distinctly segregated from the fungus garden in small, irregular cells. The fungus garden was developed on insect feces. When the nest was disturbed the workers carried the brood and fungus gardens to other cells already present in the wood.

The nest of this subspecies beside the nest of the typical form in soil as described above indicates further the similarity in ecology.

*Cyphomyrmex rimosus* Spinola ssp. *trinitatis* Weber

This subspecies is readily told from the other *Cyphomyrmex* on the island by the well developed spines or tubercles on the thorax and by the sharp ridges of the head.

Specimens from Barro Colorado resemble closely the co-types of the ssp. *trinitatis* which I found in 1934 on the summit of El Tucuché (3072 ft.) in the Northern Range of Trinidad, B.W.I. More detailed study taking into account the range in variation may show them to be closely related but different subspecies. The summit of El Tucuché has an annual rainfall comparable to that on Barro Colorado but bathed much oftener in clouds. The type ant colony was found under a piece of wood on the grassy mountain top and the fungus garden was developed on insect feces in customary *rimosus* manner.

Though found only in the northeastern part, this subspecies is probably generally over the island. The ecology of the ant is evidently similar to that of the other forms of *rimosus* and nothing peculiar about the fungus garden was observed.

All three nests found were in dense shade on steep slopes. One nest was in a cavity in the soil under a rock. The brood was separate from the fungus garden, the latter being developed on insect feces. Another nest was between two dead leaves under a piece of decayed wood on the ground close to an *Apterostigma angulatum* colony with four fungus gardens. The third nest was in reddish clay and humus under a piece of decayed wood.

*Cyphomyrmex costatus* Mann (Plate 2)

This species was described by Dr. W. M. Mann in 1922 «from three workers found in rotten wood» at Lombardia, Honduras. The species has not been recorded elsewhere.

On my first visit to Barro Colorado I found a single nest June 23 and stray workers June 26. On my brief return visit of four days in August I found no less than nine colonies of which four contained a hitherto unknown guest ant. The workers agreed well with Dr. Mann's cotypes which I hastily examined in December 1938 at the U.S. National Museum. The cotypes, however, are slightly smaller, paler and perhaps less sharply sculptured, though this may be an optical effect caused by the paler color. When the female and male of the Honduran *costatus* and the male of the Panama ants are found, it may be necessary to separate them as two forms. The June nest was on a well-drained ridge in somewhat open forest and was under a small stone 6-20 cm. in diameter by 4-8 cm. thick. The single fungus garden filled a small cell 15x10 cm. in diameter and was suspended on rootlets. The fungus garden resembled that of the higher attines and was unlike that of *rimosus*, being composed of small pellets of vegetal debris covered with a mycelium containing loose bromatia. In the soil about the nest were a dealate female *Strumigenys* (S.) and two small worker ponerines. The colony consisted of 24 workers and a single queen with a small amount of brood. Only worker pupae were in the nest and these were enclosed in cocoons in which were imbedded tiny particles of debris, evidently acquired in the spinning. The larvae were less plump than those of *Apterostigma immobile*, e. g., but had a similar disposition of hairs. These were confined to the head and ventral part of the thoracic region and were simple, curved and almost transparent. Those of the thoracic region differed from similar

hairs of the *Apterostigma* in being irregularly curved at the distal half. One larva was  $0.74 \times 0.50$  mm., viewed laterally, the head being curved toward the posterior tip, another was 1.26 mm. long and 0.51 mm. thick medially.

The larvae are easily distinguished from those of *Megalomyrmex wheeleri*, the latter having the body segments indicated by distinct constrictions instead of being smoothly joined as in Attini. The pilosity of the *Megalomyrmex*, though moderately scant, covers the body uniformly, the hairs being upright and apparently sometimes truncate, sometimes divided apically. Mature larvae are also larger, one being 1.56 mm. long.

One of the June 26 stray workers was driven out from under a fallen leaf by an army of *Eciton (Labidus)* sp., the other was among debris on forest floor.

Two of the nine colonies found August 13 to 16 contained colonies of the new guest ant, which I have named *Megalomyrmex (Cepobroticus) wheeleri*, (Weber, 1940a), and two contained single females of the guest ant. Unfortunately time prevented only the briefest of notes on the relationships but they show that the guest ant lives on the fungus grown by the host as *M. (Cepobroticus) symmetochus* Wheeler lives on the fungus grown by *Sericomyrmex umabilis*. One nest of mixed colonies and one nest of *costatus* with the female guest ant were taken alive on the Norwegian oilburning freighter which I took to San Francisco, California. The irregular temperatures, numerous handlings and vibration of the ship ruined their fungus gardens and few observations could be made before the colonies died.

The finding of nine colonies in a brief period in August compared with the finding of a single colony over a much longer period in June perhaps indicates a seasonal periodicity. Both periods were in the rainy season, however, and the evidence is hardly more than suggestive. I noticed a similar apparent periodicity in *Mycocarpus smithi trinidadensis* Weber in Trinidad. The tiny craters of this ant were much less often seen in the full rainy season than towards the end and in the dry season. During rains the craters, of course, would be washed away but it would be interesting to determine whether there was a tendency to suspend activity, above ground at least, during the rainy season.

All August colonies of *costatus* were in small earth cells

under stones and were partially supported by rootlets. The fungus garden was bluish-gray in color and friable, crumbling easily. Two colonies, evidently mature, had elliptical fungus gardens  $32 \times 13$  mm. and  $30 \times 20$  mm. in diameters, respectively, and were about 10 mm. deep. The former contained 59 workers and a single queen and a dealate female *Megalomymex*. Part of the latter colony was lost in its observation nest on shipboard and the part remaining consisted of 31 workers and eight alate and dealate females. The smallest nest found had a tiny fungus garden  $8 \times 5$  mm. in diameters and contained ten workers and a single queen. This nest was in soil under a crevice between a 13 cm. triangular rock 150 cm. from the  $32 \times 13$  mm. nest above mentioned. The ants had erected a wall of wet, loosely adhering soil grains around the fungus garden. A peculiarity in all the fungus gardens was the use of chitinous fragments of insects, especially ants, and tiny snails (both helicoid and Planorbis-shaped) as a framework for the garden. Heads of ants of *Ectatomna ruidum*, *Ponera*, *Anochetus*, *Odontomachus* spp., *Labidus* or *Acamatus*, *Pseudomyrma*, *Pheidole* spp. *Cephalotes*, *Azteca* and *Camponotus* spp. were easily recognized. The *Pseudomyrma*, *Azteca* and *Camponotus* were arboreal species so that the *costatus* must have acquired the heads from fallen carcasses. Of particular interest was the finding of the petiole of the fiercely-stinging *Paraponera clavata* worker in one nest and the head of a worker *Acanthoponera*, a rare genus, in another. Other recognizable remains were the heads of *Nasutitermes* soldiers, Hemiptera, and Coleoptera and the spiny cephalothorax of spiders. The nest containing 59 workers *costatus* had in it a snail, beetle elytra, the *Paraponera* petiole and heads of *Anochetus*, *Labidus* or *Acamatus*, *Cephalotes* and *Camponotus* spp. Other nests had a similar variety.

#### Relationships between the host and guest ants

Of the four *costatus* colonies containing *Megalomymex wheeleri*, two contained only single females of the guest ant. One female was in the most populous nest, that found August 15 containing 59 workers and a queen. The guest ant scurried from beside the nest when the stone overlying the nest was removed and no further observations were possible on the relationships. The second guest female was also beside the host nest and it was noted that she was much quicker than the *costatus*. The colony contained more than 44 workers and nine alate

and dealate females. She was removed with the colony and taken aboard the ship for the journey north. No suitable containers were available and the danger of losing her deterred examination of the box in which the ants were kept very often. August 20, at sea off the Pacific coast of Southern Mexico, she was found to have taken a position on the ceiling of the container close to a cluster consisting of a few *costatus* workers and winged females, all being above the fungus garden. The whole nest was preserved shortly after, since colder weather and the vibration of the ship were killing the colonies.

A nest of *costatus* found under a small stone August 13 contained 35 workers and one queen, while in an adjacent cell there were 56 workers and three dealate queens of the *Megalomyrmex*. In this case the *Megalomyrmex* clearly outnumbered the host ants. The whole colony of the guest ant was easily collected, since the ants milled about instead of trying to escape, though they could move rapidly. This cell was less than 10 mm. from the *costatus* fungus garden yet there was no mingling of the two and no hostility was exhibited between the species.

The second *Megalomyrmex* colony was found August 15 (Plate 2). The nest was at the very side of a *costatus* fungus garden 30 x 20 mm. in diameters and the only opening of the single cell was to the chamber containing the fungus garden. The part of the *costatus* colony which was eventually preserved consisted of 31 workers and eight dealate and alate females. The original colony was somewhat larger. The part of the *Megalomyrmex* colony which was eventually preserved contained one worker and one female but was originally larger. These ants were sluggish and easily captured. The two colonies were gathered up into the same container. Three hours later, when it was opened, two *Megalomyrmex* workers were seen beside the newly built-up fungus garden. Several guest workers gathered what seemed to be their larvae and ran with them over the fungus garden. The *costatus* ignored them. The guest ants made no effort to take refuge in the soil farther away from the garden where there were suitable crevices. This mixed colony was also taken on board ship, but no significant observations could be made before it was ended.

### *Cyphomyrmex acutus* Weber

This new species is readily distinguished from the other *Cyphomyrmex* on the island by its spinose occipital corners, acute, paired carinae of the vertex and convex thorax bearing short spines.

Only two workers were found, one June 28, the other August 13, and the species is probably rare and local in distribution. The first worker was walking over a wet, prostrate, dead tree trunk across the Zetek trail at about No. 10. The second was found near the beginning of R. C. Shannon trail and was carrying substrate along a fallen tree. Unfortunately



when the ant was picked up the substrate was dropped and lost.

The species will probably be found to grow a fluffy mycelium on vegetal substrate as does *C. bigibbosus* rather than the cheese-like bromatia without hyphae of *C. rimosus*.

*Mycocepurus tardus* Weber (Plate 3)

Ants of the genus *Mycocepurus* were not found by Dr. Wheeler on his visit in 1924 but he surmised that they might occur. They are rare, inconspicuous ants and very easily overlooked. During my hasty investigations of the attine fauna I found workers of this genus upon several occasions but unfortunately time was lacking for detailed study. They proved to belong to a new species differing from the widespread *M. smithi* and its forms in details of spinosity and color. *M. smithi* occurs in Mexico, Cuba, several of the Lesser Antilles and Trinidad. I found *smithi* nesting in the grounds of the Gatun railroad station in the Canal Zone only a few miles from Barro Colorado, yet found only the new species on the island. Either may be readily separated from other attines likely to occur on Barro Colorado by its tiny size (1.6-2.0 mm.) and thorax covered with high, sharp spines.

*M. tardus* is slow-moving and blends in so well with the clay on which it is found as to be seen with difficulty. Near the top of the island (Wheeler 12) at an elevation of fully 500 feet a crater of clay pellets made by the ants was found. Another crater at Snyder-Molino 2 was in the form of a simple, irregular cone of fine clay pellets 23 mm. high and 26 mm. in basal diameter.

The two days preceding were rainless, otherwise such a cone would have been readily washed away. This species probably resembles *M. smithi* in forming a small cell several centimeters in diameter containing a grayish fungus-garden.

*Myrmicocrypta ednaella* Mann (Plates 4, 5)

This species was described by Dr. W. M. Mann from specimens taken from colonies beneath stones at Lombardia, Honduras. Dr. Mann (1922, p. 48) found that the fungus gardens are pendulous, hanging from the underside of the stones into little pockets, which evidently are excavated by the ants. They are small in size — a little smaller and somewhat the same shape as a thimble. There are few individuals in a colony.»

My specimens from Barro Colorado resemble the type specimens closely but there are small differences which, if constant, may necessitate the separation of these ants as a new form. The species is widely distributed over the island but inconspicuous. It nests in the soil, especially on the clay ridges of the island.

Entrance to the nest is in the form of a crater of irregular shape which is readily washed away by rains. In the latter case the nest opens by a simple hole which is very readily overlooked. The crater may be in the form of a friable turret, one such turret being 35 mm. high and 40 mm. wide at the base. One nest had several external openings and a multiple crater of fine, red clay pellets. The craters were in the form of ridges which paralleled and did not separate the openings from one another. Another nest, found on the last of three rainless days, had a single opening which was half-surrounded by a ridge of clay pellets 31 mm. high and 97 mm. in length. Several craters were found in the form of irregular piles of clay pellets 10 to 20 mm. high and about 30 mm. in diameter.

The cell and fungus garden constructed by this species are large compared with the size of the ants. The cell of one nest was at a depth of 100 mm. in the soil and was 55 mm. high and  $90 \times 65$  mm. in horizontal diameters, being elliptical in shape with a flattened base. The garden was dull gray on the outside and light brown internally, the outer surface being speckled with bromatia. It was more compact and less friable than the garden of such ants as *Sericomyrmex amabilis*. The substrate contained chlorophyll but was otherwise of unrecognizable vegetal origin.

Another nest, which was in humus under a breadfruit tree beside a stream, had a cell 50 mm. high and  $30 \times 80$  mm. in horizontal diameters. The fungus-garden was similar to that described above and likewise was developed on chlorophyll-rich substrate. Within several centimeters of the nest were nests of *Ectatomma ruidum* Roger, a tiny black *Pheidole*, and a small *Tranopelta*. These ants also tolerate other attines, one nest being found 10 cm. from a nest of *Trachymyrmex isthmicus* and another 40 cm. from a nest of *T. cornetzi gatum*. This species resembles other attines in moving with great slowness.

*Apterostigma dubium* Weber

I described this species (1938b) as a subspecies of *A. collaris* Emery from specimens which Dr. W. M. Wheeler collected on Barro Colorado in 1924. Metatypes were listed from Costa Rica. Two females which I took on the island in 1938 agree closely with the holotype female of *dubium* and the constancy of their characters together with those of the worker cotypes indicates that *dubium* is specifically distinct from *collaris*. Numerous workers collected without their queens resemble the cotypes of both *dubium* and *angulatum*. They are not separated here. Where queens occur with workers the two species are easily separated on the basis of angular frontal lobes and distinctly carinate gaster in *angulatum* females compared with evenly convex lobes and feebly carinate gaster in *dubium* females.

One female was taken June 14 with her fungus garden from a cell beneath a sliver of black bark on the side of a rotted buttress of a giant tree (between Wheeler 8 and Lake trails). Nearby, where the buttress joined the trunk, was a bivouac of *Eciton hamatum* Fabr. The fungus garden was about 2.4 cm. long and was firmly attached by hyphae at the top of the cell at one side. There was no indication of a mycelial envelope. The fungus garden was a mottled gray in color and the substrate consisted of a variety of small pieces of vegetal debris from yellow to dark brown in color, together with several small insect feces. Only a single egg was found, which was elliptical,  $0.31 \times 0.43$  mm., and white in color.

The second female was taken August 13 in its cell under bark of the *Anacardium* tree being studied by Doctors Park, Voth, Williams and others. The nest occurred in Quadrat 2 at a height of 167 cm. The fungus garden was 20 mm. high, 8-12 mm. wide and as deep. Over it grew a fluffy hyphal envelope, clearly a natural growth and not made by the sole ant. The hyphae were not interwoven. The substrate resembled closely that of the other female. The garden contained a single white pupa, 3.4 mm. long, whose eyes were just becoming pigmented and whose frontal lobes appeared evenly convex. No larvae were found but two elliptical, white eggs  $0.33 \times 0.43$  mm. were imbedded in the garden.

*Apterostigma angulatum* Weber (Plates 6-9, 13)

I described this species (1938b) as a new subspecies of *A. collare* from specimens which Dr. W. M. Wheeler took on Barro Colorado in 1924. Metatypes were listed from Costa Rica. On the basis of numerous collections which I made on the island in 1938, I now regard it as a distinct species because of the constant angular character of the frontal lobes in both the worker and the female together with other characters. In *collare* the lobes are evenly convex, the neck much narrower, etc.

*Apterostigma angulatum* and *A. mayri* appear the commonest species of the genus on the island. The most conspicuous of the two species is *angulatum* because of its larger size and larger nests. Both, however, in common with the other species are dull brown in color and move so slowly, becoming motionless at the least disturbance, as to be easily overlooked. The gray fungus gardens are more readily seen when rotted logs are broken up or overturned. I have found the nests in all parts of the island from near lake level to the top at Wheeler 15. This species nests both in the ground and in rotted wood. While the species of this genus are comparatively little known, none has been recorded to be polydomous, *i e*, having a number of fungus gardens in separate cells as in higher attines. I found, however, several colonies of *angulatum* on the island nesting in this manner and also a species near *mayri* in the Andes (5800 ft.) above Medellin, Colombia, with a nest of three distinct and separate fungus gardens.

The largest number of fungus gardens found was seven in a prostrate, wet, rotted log 240 cm. long and 16 cm. in diameter, on the top of the island June 30. The fungus gardens extended over 115 cm. Each was several centimeters in diameter, grayish in color, and developed on small particles of vegetal debris and wood-boring insect feces. All were collected and the ants and brood contained in them examined with the following results. Eggs and non-adult larvae were not counted.

In this colony 133 workers, 21 winged females and one queen therefore were recovered. It is quite possible that a few workers were not in the nest, although rains a few hours before and an approaching rain which fell as I was examining the colony probably meant that few, if any, were

	Large larvae	Pupae	Workers	Winged females	Queens
Garden A	2	3 female	25	2	one
Garden B	-	2 worker	29	2	—
Garden C	3	1 worker	2	3	—
Garden D	2	1 female	25	1	-
Garden E	1	2 worker	3	1	—
Garden F	2	6 *	34	10	—
Garden G	2	2 worker	15	2	-

out foraging. A small male mosquito was collected with one garden and a non-ant insect larva and pupal case were collected with another. A colony of a small ponerine ant also nested in the log and these workers were collected about several gardens.

A polydomous nest found June 18 on a steep slope was in a crevice in red clay soil (Plate 6). A large angular rock evidently had rolled down the slope, leaving the crevice exposed which had extended against the side of the rock embedded in the soil. The crevice was exposed on the east side. Three fungus gardens in a line show in the photograph and a fourth was present on the left side. All were suspended from the roof and none was enclosed in a compact mycelial envelope but each was loosely and irregularly cellular within a somewhat continuous covering of substrate and mycelium. The middle fungus garden in the photograph was conic in shape, 55 mm. long and 28 mm. in basal diameter. It had a conspicuous opening to the loosely cellular interior. The right-hand fungus garden was collected and had in it fourteen workers, one callow, four larvae of varying size, but no female. Workers wandered back and forth between all four fungus gardens.

The outer covering of each fungus garden was studded with amber fecal droplets 2-3 mm. in diameter. These fecal droplets when excreted were undoubtedly much smaller but had probably absorbed moisture from the saturated atmosphere and grown in size.

Near this colony were found on June 24 two other colonies of *angulatum*, each eight to nine meters away from the one described and from each other. One of the colonies had a single fungus garden on the under surface of a rotted

\* Two were advanced enough to be determined as male and female pupae.

log resting on the steep hillside. The garden was damaged in discovering it and the log replaced. Three days later the ants had rebuilt the garden but the hyphae were growing rather wildy. It was significant that the hyphae showed a tendency to grow in the form of an envelope around the substrate and over the wood. The other colony was nesting between two angular corners of a large rock on the under surface imbedded in the soil. The garden did not have an envelope.

Other nests found in several parts of the island resembled the above nests in being under rocks or wood. The fungus gardens showed a tendency to develop a mycelial envelope. One such nest was under the same rock as that of *Acromyrmex octospinosus echinator* and was 46 cm. away. The fungus garden, enclosed completely in a mycelial envelope, was  $35 \times 25$  mm. in diameter and 30 mm. high. It was attached by the envelope as well as the substrate to the flat under-surface of the rock and also to the rock on one side and humus on another.

An unusually symmetrical and compact nest (Plates 7-9) was found June 22 in overturning a rotted log. Firmly attached to the under surface was the single fungus garden 45 mm. in maximum length, 32 mm. in maximum width and 17 mm. in maximum height. It was surrounded entirely by a silk-like mycelial envelope which had on the lower surface three circular perforations, three to four millimeters in diameter for the egress and ingress of the ants. Studding the outer surface of the envelope were many fine bromatia. Inside, the garden was loosely cellular and contained the colony, which consisted of a few larvae, three pupae, thirteen workers and a single queen. Several workers were callow. Several workers may have been foraging, but in any event the colony consisted of less than a score of adults.

#### *Apterostigma tramitis* Weber

This new small species was taken August 13 within a few centimeters of nests of *Myrmicocrypta ednaella* and *Trachymyrmex cornetzi gatum*. In unearthing the nest of the *Trachymyrmex* a tiny colony was found consisting of one queen, seventeen workers, two female pupae, eleven worker pupae, and larvae and eggs. It is a small species, 2.8 mm. in length, which resembles *A. mayri* in general habitus but

may be easily told by its much shorter terminal antennal joint in both worker and female. The fungus garden was developed on small particles of vegetal debris and wood-boring insect feces. There was little chlorophyll.

*Apterostigma immobile* Weber

This new species is close of *A. wasmanni* Forel and *auriculatum* Wheeler of South America from which it may easily be separated on the basis of the medial, unpaired tooth in the mesoepinotal impression. This is absent in *wasmanni* and *auriculatum*. It could readily be separated from *A. calverti* Wheeler of Costa Rica, which may occur on Barro Colorado, on the basis of the strong gastric carinae. These are absent in *calverti*. No other *Apterostigma* on the island has the strongly carinate thorax.

This species is outstanding in several respects. When the colony was discovered June 22, the behaviour of the ants was notable. The ants, both worker and male, when first disturbed, remained completely immobile for a much longer time than in other species. Then, when they abandoned this attitude, they moved quickly for a moment before again becoming immobile. The worker of the average species will remain motionless for a short time when disturbed and then will move slowly.

The single fungus garden also differed from that of the other *Apterostigma* species on the island. It consisted of coarse vegetal debris and small sections of dried leaves, all containing little or no chlorophyll, together with insect feces. The whole was very loosely held together by a scanty mycelium which exhibited no evidence of a tendency to develop an envelope. The garden was suspended by a sheet of mycelium, as is customary in *Apterostigma*, to the under surface of a rotted log which contained a foraging army of *Eciton* (*Acamatus*) sp. The garden was damaged in discovering it but was probably about  $10 \times 8 \times 6$  or 7 cm. It contained 12 males, 20 workers, two sexual pupae and larvae in cocoons.

The larvae were exceedingly inconspicuous since they were encased in a cocoon of finely fibrous substance in which were embedded small particles of substrate and debris. The larva was tightly curled so that the head faced the posterior end of the body and this ventral area was the only area not covered by the cocoon. From it protruded a few long (about

0.18 mm.), curved hairs which were simple, almost transparent and grew from both the head and ventral body surfaces. The rest of the body was hairless and finely ridged like the pressure ridges of the human finger. These larvae were short and thick, elliptical in side view, like the sexual larvae of *Atta cephalotes*. One larvae, with its cocoon, was 1.3 x 1.7 mm.; another, shelled from its cocoon, was 1.7 x 2.6 mm. in side view.

*Apterostigma mayri* Forel (Plate 2)

This species, originally described from Trinidad, has a wide distribution in South and Central America. It is generally distributed over Barro Colorado though easily overlooked because of its small size, dull gray-brown color and slow-moving habit, becoming temporarily motionless when disturbed.

Several nests were found in cells in the soil beneath rocks. The beginning of a colony was found June 26 in soil 9-11 cm. beneath a nest of *Trachymyrmex isthmicus* and 3 cm. to one side. A single female had formed in a vertical lens-shaped cavity about 25 mm. high and 10 cm. wide a tiny fungus garden suspended on a rootlet. The garden consisted of very small pellets of vegetal debris very loosely held together by hyphae. A nest found August 15 was under an angular stone and was 37 cm. from a nest of *Cyphomyrmex costatus*, the two colonies occupying identical micro-habitats. The single fungus garden hung freely from the rock into a triangular cavity 38 x 50 x 63 mm. The cavity seemingly had been made by the ants. No mycelial envelope covered the garden. This consisted of small particles of vegetal debris, some containing chlorophyll, and insect feces. It contained 44 workers and a single queen.

Beside or under an angular stone 15 cm. in diameter were found on August 15 three fungus gardens a few centimeters from one another. One garden, on a 15 x 7 mm. dead leaf section beside the stone, contained thirteen workers, two worker pupae and several plump larvae; the second, under the stone, contained two workers, twelve unpigmented worker pupae and two plump larvae; the third, also under the stone, contained only four workers. The three gardens evidently were part of a polydomous nest and the queen either escaped into the surrounding humus or was in a fourth garden which was not noticed. A 9-jointed worker of *Rhizomyrma* was



collected with one of the gardens but very probably was not associated with the *Apterostigmas*. A similar worker of *Rhizomyrma* was taken nearby on the same day in another *mayri* fungus garden against one side of a rock half-buried under leaves.

*Sericomyrmex amabilis* Wheeler (Fig. 10)

This species was described in 1925 from Barro Colorado and has not since been recorded. Dr. Wheeler discovered living in ten out of twelve colonies of this species a guest ant, also new, which he named *Megalomyrmex* (*Cepobroticus*) *symmetochus*. He found (1925, p. 162) the guest queen with a few of her workers usually took up her station «in one of the crypts of the fungus garden a short distance — half to three-quarters of an inch — from the *Sericomyrmex* queen. The guest ants kept their brood in small clusters scattered through the garden and each cluster was cared for by a few workers. Although the ants and their brood were thus intermingled, the workers of each species lavished their attention exclusively on their own eggs, larvae and pupae and were never seen even to transport the progeny of the other species from one part of the garden to another.» The colonies of the host usually contained between 100 and 200 workers, the largest nest found containing about 300 workers while the colonies of the guest ant comprised about 40 or 50 workers and in no nest as many as 75. The guest ants fed upon the fungus grown by the *Sericomyrmex* and there was mutual toleration shown between the two species.

I found this species to be generally distributed on the island and was able to examine two nests, one of which contained a colony of the *Megalomyrmex*. The mixed colony was gathered June 25 and placed in a Petri dish for examination until I had to preserve it June 29 before leaving for Colombia. The brief observations which I had time to make confirmed Dr. Wheeler's more extensive observations in every important detail. The other colony, found August 13 in Quadrat 1 at a distance 60 cm. from the base of the *Anacardium* tree being studied by Doctors Park, Voth and Williams, comprised four fungus gardens, in none of which were *Megalomyrmex*. A third nest was found August 13 at a distance of 50 cm. from the same *Anacardium* tree but in Quadrat 4, on the opposite side and several meters away.

Time did not permit examination of this nest. Also on August 13 a worker was found carrying part of the hull of the fruit of an «Espinosa» tree. A stray worker found June 25 foraging at 9 p. m. proves this *Sericomyrmex* to be nocturnal, at least on occasion. Dr. Wheeler noted a dealate female *Rhizomyrma* sp. in soil about an *amabilis* nest and I found *Rhizomyrma* workers in the bottom of the nest of Quadrat 1 above mentioned.

The June nest containing the *Megalomyrmex* was on a clay ridge in high forest. The nest opening was a mere hole among leaves and a trail of clay pellets led away from it. The fungus garden was 65 mm. below the surface and 35 mm. to one side (uphill) of the nest opening. It was 35 mm. high and 60-65 mm. in diameter, being elliptical in form except for the flattened base. The fungus garden was friable, gray externally and light brown internally, and was developed on a vegetal substrate. The colony of *Megalomyrmex* was in the garden near the base. In collecting the nest the colonies were thoroughly mixed with the broken fungus garden but no hostility was shown between the two species. By 1:30 p.m. June 27 the garden had been re-constituted. The queens of the two species were not visible but workers of both were wandering freely about. A *Megalomyrmex* worker spent fully a minute carefully cleaning itself in a cell containing *Sericomyrmex* pupae of different ages and host workers without being molested. Three host workers were in another cell licking guest larvae and pupae. The next morning the host ants seemed to have taken possession of one cell in the garden and were concentrated there. At 9:30 p.m. June 28 a *Myrmicocrypta ednaella* worker was placed in the nest. It quickly ran down into one of the cells of the garden and disappeared. The *Sericomyrmex* workers were disturbed but did not pursue. Workers of *Apterostigma angulatum* and *A. mayri* were also placed in the nest. They ran into the clay surrounding the nest and did not disturb the hosts. At 8 o'clock the next morning none of the alien ants except an *Apterostigma mayri* could be seen. This was in the clay 15 mm. from the garden. When a piece of the garden of a colony of *Myrmicocrypta ednaella* was placed in the nest nine *Sericomyrmex* workers immediately clustered about it as it lay against their own garden. They then dismembered it, at first dragging the pieces to one side, then

later taking them all to a refuse heap. The *Megalomyrmex* workers came up and explored the pieces but took no part in the removal.

As Dr. Wheeler noted, the guest ants are very much quicker and more agile than the deliberate, slow-moving *Sericomyrmex*. The two also contrast sharply in appearance, the guest ants being a shiny, sleek brown with few hairs, the host being angular and dull-colored to the naked eye.

The stomach of a basilisk lizard (*Basiliscus basiliscus* (L.)) from Miraflores, Panama, contained a female of this species.

*Trachymyrmex isthmicus* Santschi (Plate 12)

This species was described in 1931 (Santschi, 1931) on the basis of two workers from Barro Colorado sent by Dr. G. C. Wheeler for determination. No other records of this species have been published nor any information on its habits or nest.

This species is evidently widely distributed on the island as my records from Va Tine, Snyder-Molino and Shannon trails would indicate. The nest entrance may be surrounded by the customary crater or this may be erected in the form of a friable turret. The nest chamber is buried in a few centimeters in the soil and the fungus garden resembles that of the typical attine. Like the average attine, it is not averse to nesting in the vicinity of other species of this tribe and I found one nest 10 cm. from a nest of *Myrmicocrypta ednaella*. *Cyphomyrmex rimosus* workers were foraging freely about both.

A colony of this species revealed a hitherto unknown habit which may be of general occurrence among Attini, a moving of the entire nest contents, piece by piece, from one site to another, evidently in response to a change in the environment.

June 22 at 10:50 of a rainless but alternately bright and part cloudy morning workers were discovered on the steep clay slope just below the second hundred meter post of Shannon trail. Each worker traveling westwardly was carrying a load and each one marching eastwardly was empty-handed, or rather empty-jawed, since only the mandibles are used by ants for carrying objects. Closer examination revealed that

these loads were definitely fragments of a fungus garden and that I had stumbled upon an attine migration.

From 10:50 to 11:55 this migration was continuously watched. Not only were the ants carrying the fungus garden but also larvae which were covered with a mycelium, a common condition among Attini; one ant carried a piece of insect feces. As many as five workers would be seen at one time carrying loads. All were marching between two holes which were separated by 37 cm. in a direct line but the path the ants took over two large roots, a number of leaves and their own crater, when measured with a chain was 52 cm. The holes were 6 mm. in diameter and obviously 6 mm. was the maximum width of the object which could be removed. The hole to which the ants carried loads was bordered by a semi-circular crater 6 cm. high and 11 cm. in maximum diameter over which the ants crawled. This hole was at a slightly higher level than the other, the latter being in a slight depression among the roots. The volume of material carried by each ant was from twice to five times that of its head. Four consecutive workers were checked for the time necessary to come out of the old entrance and carry the load to the new entrance with the following results in seconds: 65, 67, 80, 63, an average of 69 seconds. During this period a worker *Ectatomma ruidum* came up, took a position 10 mm. the line of march on the crate slope and «froze» but did not interfere. It eventually moved off, evidently not detecting any available prey or piece of food. Six workers were above ground carrying loads at 11:02. From 11:07 to 11:17 22 workers left the old nest with loads for the new, an average of 2.2 workers per minute. One worker returned to the old nest with a piece of dead l.f. In a five-minute period, 11:35 - 11:40, the following twelve ants came out with loads: 1st minute - one ant; 2nd minute - no ants; 3rd minute - five ants close together; 5th minute - two ants. One worker went down the old entrance with a piece of dead leaf. The rate 2.2 ants per minute by coincidence is exactly that of the earlier period but in neither period did the ants come out at regular intervals. When I picked up one worker with its load of fungus-garden the ant dropped it near the trail but another came along soon, promptly picked the load up and took it down the new entrance.

At 2:45 p.m. the ants were still carrying pieces of the

fungus garden, the afternoon being bright, clear and hot. In a ten-minute period (2:45 -- 2:55) only seven carried loads to the new nest while fourteen returned empty-jawed to the old crater. At this time it thundered intermittently overhead. At 3 p.m. four workers were timed between nest entrances as in the morning with the following results in seconds: 70, 80, 51, 71, an average of 68 seconds for the time taken to traverse the 52 cm. path. This compares closely with the 69 second period in the morning. Both in the morning and in the afternoon it was noticed that the ants did not follow exactly the same path; the deviations, however, were usually but a fraction of a centimeter and so unimportant. When one worker would deviate slightly the following ant would sometimes, but not always, follow it. This would indicate that it is not only «memory» but the chemoreceptors which enable an ant to follow a trail, each ant leaving an odor which the following ant picks up. Where a trail is followed by many ants such a strong odor trail is laid down that the individual ant variations from the path are only occasionally followed and it is easy for an ant to get back on the trail. The area covered by the trail was not physically altered to the human eye.

Since in the afternoon a perceptible number of empty-jawed ants were returning to the old nest I timed the return speed for four consecutive ants with the following results in seconds: 56, 51, 66, 55, an average of 57 seconds. Both the 51 sec. and the 55 sec. ants stopped momentarily to exchange antennal caresses with two laden and one unladen ants. The ants sped up noticeably when they crossed the even expanse of a dead leaf in the middle of the path.

Ants were still carrying loads at 4:05 p.m. The next morning, June 23, between 8:30 and 9:30 there was no sign of activity. The crater had been somewhat beaten down by the rain at night. The morning was partly cloudy and the humidity very high. During the afternoon 2.5 inches of rain fell.

June 24, 11 a.m. no ants were out. The morning was partly cloudy but no rain fell. All evidence of a crater was washed away by the previous day's heavy rain. Both entrances were open. Several workers appeared at the entrance to the new nest but there was no activity outside either entrance. At 11:10 four or five workers, milling about in the new en-

trance, came slowly out and explored the vicinity of the nest. At 11:12 one went down the old entrance. At 11:14 a worker came out of the old entrance with a burden of fungus garden which it took to the new entrance. At 11:17 another came out of the old entrance with a similar load; several ants from the new entrance went down the old entrance. At 11:26 a worker came out of the old entrance, explored the surface within a radius of about 2.5 cm., then picked up what seemed to be a pellet of clay twice its head size and went down the same entrance. Random actions of this nature have frequently been watched in ant colonies. From 11:10 to 11:34 only two loads of fungus garden were transferred. From 11:25 to 11:32.5 a worker from the old entrance tugged on a small section of yellowed dead leaf stem three centimeters from the entrance. When the stem finally came loose from the soil the ant carried it directly to the new entrance, taking 1.5 minutes for the trip. During the afternoon and evening 1.28 inches of rain fell, thus stopping all activity above ground.

June 25 at 11:15 a.m. the old entrance was found to be still blocked up by the June 24 rain. The shallow depression in which it stood had been partly scoured and partly filled with debris by the water running down the slope. A fallen leaf partly covered the new entrance but several ants could be seen at the entrance. At 9:30 p.m. in the clear evening both holes were blocked up with soil, evidently by the ants, since no rain fell all day. No soil had been carried out from either entrance and the ants had probably been occupied all day with rearranging the fungus garden in the new nest.

On June 26 at 2:45 p.m. there was still no sign of the old entrance and occasionally at the new entrance workers clustered without coming above ground. The day was clear and no rain had fallen since June 24. No excavating had been done as indicated by the lack of a crater or soil grains in the vicinity.

On June 27, 0.11 inches of rain fell in the morning. The afternoon was overcast. At 4:45 p.m. the ants were found to have opened the old entrance. At the new entrance two workers could be seen. No activity was seen above ground and no ants were visible in the old entrance.

No further observations could be made until August 13 because of a trip to Colombia.

On August 13 there was no sign of the old entrance and rains had washed away what crater may have been built around the new entrance so that only the bare entrance remained.

The history of this migration may be reconstructed as follows:

This colony of ants probably nested successfully during the preceding dry season, and perhaps for a longer period, in a slight depression on this steep clay slope. During the seven-day period, June 14-20, inclusive, 8.40 inches of rain fell and this depression became water-soaked, inundating the nest or at least soaking the walls of the chamber and wetting the garden. June 21 was a rainless day and the ants started to move the fungus garden and brood to a higher, less water-soaked situation. When I found the nest on June 22 the moving was well underway. By the morning of June 24 the entire nest had been moved. Three days were thus probably consumed in moving. Assuming for rough purposes of calculation that the ants worked steadily the entire time and that 2.2 trips per minute represented an average number, the total number of trips in the 72 hours would be of the order of magnitude of 10,000.

*Trachymyrmex cornetzi* Forel ssp. *gatum* Weber

Santschi (1931) has described and illustrated a single worker from France Field, Panama, as *T. uncifer* whose description and illustration differs in many respects from my Barro Colorado ants, which I have described as a *cornetzi* subspecies. Though he does not compare *uncifer* with any other ant it is possible that the two forms are more closely related than a description based upon a single specimen would indicate. My specimens agree well with those which I have taken in Trinidad, British Guiana and Colombia, which are clearly referable to *cornetzi* or its subspecies *bivittatus*, except for subspecific differences.

This form is widely distributed on Barro Colorado and I have taken it in the vicinity of the laboratory and Snyder-Molino, Shannon, Fairchild (No. 11), and Wheeler (nos. 7 and 9) trails. In a hike along the entire length of Fairchild trail June 21 a worker of this form was the only attine seen (at No. 11) though I looked briefly for them in many places. In August, however, I found ants belonging to several attine species at the beginning, and a colony of *Acromyrmex echinator* at the end of this trail.

Two nests were found, one June 12, and the other August 13. Both had crater nests of typical attine construction. The June nest had a crater 60 mm. high, 90 mm. in maximum diameter and a nest opening 3 mm. in diameter. The fungus garden was in a cell at a depth of 70 mm. whose diameter was about 50 mm. The ants were somewhat quicker in their movements than is common in *Trachymyrmex*. One worker was seen carrying in unrecognizable black vegetal matter. The August nest was 30 cm. from a nest of *Myrmicocrypta ednaella*. The *Trachymyrmex* crater was 25 mm. high at a depth of 40 mm. The fungus garden was found in a cell 35 mm. high by 25 mm. in diameter. The garden was bluish-gray externally, yellowish-brown internally. A lone female was taken by Dr. E. C. Williams, Jr., on July 19 and I found another female June 13 walking on a fallen leaf.

These ants use caterpillar feces and vegetal debris for substrate and one worker was seen carrying a piece of a flower to its nest close by an old French dump cart used in work on the Canal years ago. One worker was seen foraging close to a nest of *T. morgani*. Where *gatum* workers were carrying out sand grains from their nest a worker of *Aphlenogaster* (*Deromyrma*) was watched. Several times it ran quickly up to the attine workers, as if to snatch their loads, only to retreat without encounter. Perhaps if the attines had been carrying insect remains they would have been startled into dropping them to the advantage of the robber *Deromyrma*. The phlegmatic attines, however, kept on with their work.

*Trachymyrmex morgani* Weber (Plate 11)

This new species, which I have dedicated to the buccancer who sacked Old Panama, is so small (2mm.) and inconspicuous as to be easily overlooked. I found it on three occasions near Snyder-Molino and the beginning of Shannon trails but it undoubtedly is more widespread on the island and the Isthmus. Like the other related small species, it is probably locally distributed and comparatively rare. Several workers were detected coming out of a hole 3 mm. in diameter in a vertical wall on the clay ridge up which Snyder-Molino trail extends. These ants were moving about slowly. If this was the nest entrance, rains had probably washed any turret or crater entrance at this steep and comparatively exposed place.



A nest found June 22 on a very steep slope with a northwest exposure was surmounted by a turret of fine clay grains 21 mm. high and 11 mm. thick which leaned downward at an angle of about  $10^{\circ}$  from the perpendicular. From an opening 4 mm. in diameter a tunnel led about 60 mm. to the nest chamber. The chamber was lens-shaped with the long axis perpendicular instead of horizontal as in most Attini. The diameter was about 30 mm. and the width about 20 mm. Five holes pierced this chamber and may have represented entrances to the outside which had been filled by the wash of clay down the slope or may have represented the beginnings of accessory chambers. The grayish fungus garden, irregular in shape but nearly filling the chamber, was suspended on rootlets piercing the chamber. It was noteworthy in that the bromatia were unusually compact and suggested the cheese-like bromatia of *Cyphomyrma rimosus*. A scanty mycelium, however, covered the substrate and such a mycelium is lacking in *C. rimosus*.

*Trachymyrmex zeteki* Weber

This species is dedicated to Mr. James Zetek, who has taken such excellent care of the island. The workers from which it is described were taken from their nest on the steep hill in dense shade. The nest was accidentally discovered June 13 in digging a hole back of the laboratory and was damaged before extensive observations could be made. The single chamber of the nest was at a depth of about 67 mm. and was horizontally elliptical, 42 mm. high by 80 mm. wide. The fungus garden, only slightly smaller than the nest chamber, was of typical attine appearance.

A single worker was taken June 25 while it was foraging over the forest floor near Snyder-Molino trail at 9 p.m.

*Trachymyrmex balboa* Weber

This new species is dedicated to Balboa, the discoverer of the Pacific Ocean. The workers from which it is described were taken on a steep hillside just above a stream on Barro Colorado. From a hole  $15 \times 7$  mm. in the steep bank at a point immediately below a horizontal root the ants carried soil 16 cm. away to form a crater,  $11 \times 19$  cm., to one side and slightly below the entrance. Workers were busily en-

gaged in excavating, as many as 15 being out of the nest at one time. Each worker leaving the nest carried a glistening pellet of tan clay as large as its head to 1 1/2 times larger. There was unfortunately no time to excavate the nest. A worker taken at Wheeler 9 trail was at the entrance (12×7 mm.) to its nest. The crater to the nest was about 10 cm. away. A stray worker found walking on the forest floor at 9 p.m. is the only other record of this species.

*Acromyrmex octospinosus* Reich ssp. *echinator*  
Forel (Plate 13)

This is the only *Acromyrmex* recorded from Barro Colorado. *Acromyrmex* is found throughout the American tropics from Arizona to Argentina and many forms have been described. The subspecies *octospinosus* has a wide range, including the Guianas, Trinidad and Venezuela, while the subspecies *echinator* is known from Mexico to Rio Frio, Colombia and Guayaquil, Ecuador. Many species, especially of the subgenus *Moellerius*, have invaded grasslands and cultivations but as a whole this is a forest genus. I have found the subspecies *octospinosus* nesting in such diverse places as 14 ft. up in the crown of a palm in the Port of Spain Botanical Gardens, Trinidad, and in debris about the base of a clump of palms barely above high tide level in the swamps of the Orinoco Delta. The members of this genus are second only to the *Attas* in conspicuousness of their leafcutting activities. They may readily be told from *Attas* by the absence of a large soldier caste, the tuberculate as well as spinose integument which is dull instead of shining, and by the stouter habitus. The trails never are as broad and populous as a well-developed *Atta* trail.

*Echinator* nests on Barro Colorado in the unbroken rain forest and is probably found in all parts of the island. The nest figured (Plate 13) was found August 15 on the rocky slopes close to Barbour trail near the fifth hundred meter post in a well-drained situation under a small, angular rock. The fungus garden, pale yellow in color, was 10 cm. in greatest diameter and 3.7 cm. deep. It rested on small, angular fragments of rock upon the ground and no excavation had been made. Close to the garden was a pile of exhausted substrate 3.5 cm. long, 1.5 cm. wide and 1.5 cm. deep which was of a yellowish brown color. 46 cm. from the garden was a

small nest of *Apterostigma angulatum*, also on small rock fragments. Such a situation for these nests insured a nearly constant environment. Investigations of Allee (1926) and others have shown that in the dense rain forest shade relative humidity on the forest floor is nearly constant, daily and seasonal, while the temperature likewise varies only slightly. This rocky slope was well shaded and only small, transitory patches of sunlight would fall upon the rocks, too ephemeral to heat them. The fungus gardens, being suspended on rock fragments under larger rocks, were well protected from any tendency of torrential downpours to wash them away.

In this nest workers, brood and a single queen were present. From the circumstance that single, dealate females June 10 and June 14 were found crawling by themselves under leaves one would suppose that they had but recently lost their wings after a marriage or dispersal flight, at which time males would also emerge. Mature males and virgin females thus may be expected to be found in nests in May or nearly June. The onset of the rainy season at this time is probably the stimulus that leads them to take flight. This is in accord with my findings in Trinidad concerning the subspecies *octospinosus*.

Visitors to Barro Colorado may observe an amusing habit of this ant if they will take a flashlight on a calm night and look in the vicinity of the cook shack back of the laboratory. More than once in June and in August I found long files of workers pillaging the garbage can and its vicinity for what starchy food, particularly bread, had been left by an active troop of *coati mundi* and the semi-tame female deer which hung about the clearing. Each worker would take a piece several times the size of its head firmly in its mandibles and march off, with the piece held erect above the thorax, to the edge of the clearing. This mischievous habit frequently arouses the ire of cooks and storekeepers as I have more than once observed. A worker in the British Guiana goldfields, held responsible for a cache of supplies at a temporary depot, was nonplussed at the melting away of the store of rice, split peas and soda crackers (biscuits). At the time of my visit the cause was readily explained. A long army of workers of *Acromyrmex coronatus andicola globoculis* Forel were filing out from under the log floor of the hut, each carrying a large piece of cracker.

*Atta columbica* Guér. var. *tonsipes* Santschi

This variety has been known only from the original description based on specimens from Bellavista, Agua C'ara, and Colon, Panama. I found it on Barro Colorado and also nesting on a slight knoll in the wet savannahs near Juan Diaz on the Pacific side of Panama as well as in Marsh's Zoo near the ruins of Old Panama. It may well be a savannah form which originally occupied the lowlands before Gatun Lake was formed and hence may not be a form strictly endemic to Barro Colorado.

A nest at the end of the F. Drayton Trail was found in the heavy *Heliconium* growth just back of Termite House. At 9 a.m. of an overcast morning workers, mostly media, were marching in large numbers, with much regularity in the file, to a point under the house but there was unfortunately no time for other observations. The Juan Diaz nest was in lush grass and part of the nest was beneath a large, long dead and whitened, tree trunk. No distinct craters were seen, but one large tunnel extended more than a foot under the tree. At the time of the brief visit in the middle of a hot, sunny morning the numerous workers were cutting leaves of herbs and bushes. Similarly at Marsh's outdoor Zoo, thousands of workers at midday in the bright, hot sun were cutting leaf sections from the trees in the Zoo. I was told that they carried off corn and other food given to the birds in the outdoor cages. The workers formed dense, continuous files marching over the floors of the various cages, ignoring birds, cats rodents and other animals. The stomach of a basilisk lizard (*Basiliscus basiliscus* (L.)) from Rio Indio, Gatun, Panama, in the Field Museum contained workers of this ant.

*Atta cephalotes* L. *isthmicola*, ssp. nov.

The common *Atta* of Barro Colorado has been identified as both the typical *Atta cephalotes* and as *A. cephalotes polita* Emery (Allée, 1926; Lutz, 1929). *A. polita* is regarded as a well-defined species found from Bolivia south; the Barro Colorado form obviously belongs to *cephalotes* and has remained undescribed.

The female differs from typical *cephalotes* chiefly in having shorter and sparser pilosity so that the body appears smoother, the elongate brown blotch on the gaster more distinct, and the sculpturing

of the head feebler. The soldiers are polymorphic (about 8-13 mm, long; thorax length 4.1-5.4 mm.), have the hairs of the front part of the head extending higher than in *cephalotes* and the occiput more densely and deeply punctate except on the sides so they seem less «bald-headed». Media and minima workers have a much shinier integument, darker thorax, and more curved anterior thoracic and epinotal spines than cotypes of the variety *erecta* Santschi of Costa Rica; their thoraces are darker than those of typical *cephalotes* and contrast more with the paler head and thorax.

Holotype female and cotype workers are from one colony (N.º 753) which I collected June 12, 1938 on Barro Colorado Island just off Snyder-Molino trail at N.º 1 post.

*Atta cephalotes* and *A. sexdens* are two of the economically most important ants in the world. Their depredations on agriculture have made necessary detailed studies with a view towards their control, particularly in Mexico and Brazil. Generally speaking, *A. cephalotes* occupies the northern half and *sexdens* the southern half of the continental New World Tropics though their ranges overlap in the Guianas and elsewhere. The other species are more limited in distribution.

*A. cephalotes isthmicola* is distributed generally over Barro Colorado and the files of workers carrying sections of leaves are often to be seen. They frequently follow well-defined trails for many yards and also follow raised logs and branches near the ground, thus avoiding obstacles. Not only do they carry green leaf and fresh flower sections but sometimes dead and discolored parts of leaves. Such a habit was exhibited by a file of workers June 10. These were carrying dead leaves which were quite wet from rain falling an hour or so before.

June 12 a file of workers was climbing the smooth gray back of a tree to a height of fully 12 meters to some of the outer branches of the crown. Here they cut sections of the acuminate-ovate smooth leaves, frequently leaving only the larger veins of the leaves. It was 63 meters from the tree to the base of the ant nest. Only the workers of medium size were engaged in leaf-cutting. One solitary worker was found two meters above ground on top of a rotted branch of another tree 2.5 meters away. It was alone and had evidently fallen down from the tree being stripped. Two of the numerous fungus gardens of the nest were exposed, each at a depth of about 20 cm. They were about 20 cm in diameter, suspended on numerous roots, and were gray externally, yellowish



Nest of *Cephalotermes rufescens* Spinola as it appeared when the overlying log was removed. In the irregular chamber's center, appears the fungus garden of insect feces with cheese-like tiny masses of bromatua peculiar to this widespread species. Barro Colorado Island, N. A. Weber photo.



*Cyphomyrmex costatus* Mann nest on left which contained a colony of the m. A. quest. ant. *Myrmica* nest on right. The same fungus garden of *Termitomyces* was in an earth cell which opened only to the single fungus garden of the same ant. (Barro Colorado Island, N. A. Weber photo)



Crater entrance to nest of *Mycoceponus cecidius* Weber to left of 114 mm forceps. Several openings lead to the single tunnel which in turn leads to the fungus garden in the soil several centimeters below the surface. (Buro Colorado Island, N. A. Weber photo)





Irregular crater entrance to nest of *Myrmicodia apta* *laodilla* Mann. Several centimeters below the surface was the single large fungus garden. Larva.



Nest of *Myrmecocrypta cubanella* Mann. Forceps (113 mm long) point to nest entrance beneath which is the single fungus garden (Barro Colorado Island, N. A. Weber photo)



Polydomous nest of *Apterostigma a. guichardi*. Weber in a crevice in the soil the crevice has been against a boulder which had rolled down a steep slope. Beneath the 15 cm ruler appear two fungus gardeners and there was another on each side. Burro (Colorado Island, N.A. Weber photo)

W. A. Weber  
Fungus-growing ants



Fungus garden of *Apterostigma angulatum* Weber clinging to the under surface of a log as it appeared when the log was overturned. The garden fitted into a symmetrical cell in the soil. Steel tape ruled in half-centimeters. (Barro Colorado Island, N. A. Weber photo.)



Close-up view of the garden of *Pseudomyrmex* sp. (Plate 8, fig. 1) on Plate 8. The entire garden is covered by a silk-like mycelial envelope except for two openings on the right (Barro Colorado Island, N. A. Weber photo)



Close-up view of the garden of *Apterostigma vagitatum* on Plate 7, as it appeared when the ventral part of the envelope was removed. Loosely cellular fungus garden contained the brood and adult ants. (Barro Colorado Island, N. A. Weber photo.)



Test of *Sericomyrmex amabilis* Wheeler which contained a colony of the guest ant, *Megalomyrmex symmetochus* Wheeler. The latter colony occupied the lower part of the fungus garden of the host. Steel tape ruled in half-centimeters. (Barro Colorado Island, N. A. Weber photo)



Crater entrance to nest of *Leptothorax curvispinosus* (Weber), one of the smallest species of the genus. Forceps 113 mm long.  
Barro Colorado Island, N.A. Weber photo.





Site of the nest-mixing of a colony of *Leptothorax curvispinosus*. Entrance of the old nest at the tip of the forceps (which are 113 mm long). (Enter entrance to the new nest in upper right. Both taken by the ants in a very long tunnel and brood to new site 52 cm. long. Harro, Colorado Island, N. A. Weber photo)



Nest of *Atta cephalotes* in garden. (Note: lower right, containing a single fungus garden as it appeared when the overlying rock was removed. The rock also covered the small nest of *Atta cephalotes* in the upper left.) (Barro Colorado Island, N. A. Weber photo)



Large multiple-crater nest of *Atta cephalotes* subsp. *Atta diademata* Weber on a moderate slope. By persistent defoliation the ants had formed a clearing about the nest. Partly defoliated small palms and saplings in foreground. Barro Colorado Island, N. A. Weber photo.

internally. *Bromelia* were abundant on both gray and brown parts. A single queen was found in one of the gardens.

A large nest is to be found on a moderate slope at R. C. Shannon trail at No. 11. This nest, on June 23, was 6 meters wide at the base, following the contour of the slope, and extended 10.5 meters up the slope. The base was close to a pile of old French wine bottles left from the French attempt at digging the Panama Canal. Extending in this direction and beneath the human trail was a small tunnel which was uncovered in four places of small area. The workers were traveling in this tunnel all morning although no ants were to be seen above ground except at the highest crater, where a few minima workers were bringing up soil particles. Rain had beaten down many leaf sections about the nest. Many were dead and black but there were some freshly green. These had doubtless been beaten down by rain which fell from 8:30 to 9:30 the previous evening. My observations in British Guiana and Trinidad (Weber, 1937b) on the responsibility of the ants for the clearing commonly found about long-established nests of *cephalotes* were strikingly confirmed here. Three saplings on the nest 2.5, 2.3 and 2.2 meters, respectively, in height were completely defoliated. A young palm 1.7 meters high was partly defoliated as were numerous saplings. The persistent defoliation of the young trees growing over the nest in all probability eventually kills them. The larger trees are not importantly harmed and persist unless the aeration at their roots in time causes damage.

When the nest was revisited June 26, 4:30-5 p.m., the ants were not active above the nest though a few were

	Trinidad, etc., <i>cephalotes</i>	Barro Colorado <i>cephalotes</i> <i>isthmicola</i>
Habitat	forest	forest
Soil preference	clay	probably clay
Shape of nest	multiple crater	multiple crater
Depth of first gardens	shallow	shallow
Size of gardens	large (about 25 cm)	smaller (about 20 cm)
Appearance of garden	quite uniformly gray-brown	gray outside, yellowish-brown inside
Workers	aggressive	aggressive
Polymorphism of soldiers	slight	marked
Soldiers	easily provoked from nest	reluctant to leave nest

traversing the tunnel beneath the human trail. Withered green leaf sections on the nest showed that they had been active the previous night in leaf-cutting. Those sections that had been dropped around the nest entrances obviously had been there all day.

The table on page 129 compares the Barro Colorado *cephalotes isthmicola* with the *cephalotes* found in Trinidad, the Orinoco Delta in Venezuela and British Guiana.

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**Nouveaux Curculionides du Brésil (II)**

por A. Hustache, Lagny (S. &amp; M.), France

**Hylobiinae***Myrtacebius*, n. gen. (Anchonini, Cycloterina)

Rostre subcylindrique, peu élargi à l'extrémité, ses scrobes subapicaux, immédiatement dirigés en dessous, en arrière séparés, en avant à peine visibles examinés en dessus. Antennes glabres, remarquablement fines, tous les articles hérissés de 2 à 4 longs cils, le scape n'atteignant pas tout à fait l'angle inférieur de l'oeil, le funicule de 8 articles, le 1er ovale oblong, très gros, aussi épais que le sommet du scape, les suivants filiformes, allongés, brusquement épaissis à leur sommet, le 2e plus de quatre fois aussi long que large, les suivants graduellement plus courts, les derniers plus du double aussi longs que larges, la massue étroite, fusiforme, acuminée au sommet, moins épaisse que le 1er article, articulée.

Tête lisse, le front déprimé, rugueux, plus large que le rostre, les yeux transversaux, grands, ovales, peu convexes, leurs facettes grossières. Prothorax transversal, fortement rétréci en avant, sa base légèrement arquée; en dessous fortement comprimé latéralement et ses bords latéraux en arête obtuse. Ecusson indistinct. Elytres subcordiformes, plus larges que le prothorax, le bord marginal fortement sinué; pourvus de 10 stries ponctuées, la 9e réunie à la 10e au niveau des hanches postérieures. Pattes assez élancées; fémurs claviformes, en dessous râpeux et pourvus d'un très petit denticule. Tibias droits, hérissés de soies sur leur tranche externe, leurs corbeilles terminales courtes. Tarses peu allongés, le 3e article fortement bilobé, les ongles libres et divariqués. Prosternum en avant plan et avec son bord antérieur échancré en arc, les hanches globuleuses, subcontigues, beaucoup plus rapprochées du bord postérieur que du bord antérieur. Métasternum très court, entre les hanches intermédiaires et postérieures de moitié aussi long du diamètre de la hanche intermédiaire. Saillie intercoxale postérieure plus large que la hanche et tronquée en avant. Derrière la hanche postérieure les deux premiers segments ventraux longs et égaux, le 2e dans le milieu plus long que le 3e; toutes les sutures profondes, droites, mais la lère en son milieu oblitérée par la ponctuation grossière.

Insecte ovale, fortement sculpté, hérissé de soies. Aptère. Genre remarquable par ses antennes. Sa forme ovale, courte rappelle celle des *Cycloterinus* particulièrement de *C. foveatus* Kolbe, mais le vertex est lisse et séparé nettement du front. Densément ponctué comme la base de rostre, le rostre est continu avec le front sans trace de sillon transversal. Il ressemble encore davantage à un très petit *Cycloteres* Schönh. de Madagascar.

Le génotype est:

*Myrtacebius Bondari*, n. sp.

Ovale, brun, mat, les pattes plus clairs, les antennes et les tarses d'un rouge jaune. Elytres ornés d'une fascie médiane arquée, cendrée, légère, n'atteignant pas les bords, formée de courts poils peu serrés.

Rostre moins long que le prothorax, arqué en avant, à sa base rugueux et mat ainsi que le front, ensuite lisse, luisant, très éparsément pontillé; pourvu ainsi que le front de quelques courtes soies. Prothorax transversal, s'élargissant et les côtés rectilignes de la base au tiers antérieur, de ce dernier point les côtés arqués et fortement convergents jusqu'au sommet; peu convexe, transversalement impressionné derrière le bord antérieur; la ponctuation grossière, serrée, profonde, transversalement rugueuse; avec un large mais peu profond sillon médian ponctué; avec quelques poils jaunes épars, et quelques soies dressées.

Elytres à peine plus longs que larges, la base légèrement échancrée en arc, finement rebordée, les angles huméraux saillants en avant; élargis dans leur quart basal, les côtés arqués, ensuite peu rétrécis jusqu'au milieu; dans leur moitié postérieure fortement rétrécis et au sommet brièvement arrondis ensemble; peu convexes en avant, fortement déclives dans leur moitié postérieure; grossièrement ponctués striés, les points séparés par des petits granules luisants, les interstries transversalement découpés et granulés, les soies fauves et nombreuses; vu de haut le bord latéral paraît denticulé, particulièrement en avant. Dessous grossièrement ponctué, les points sétosulés, sur les deux premiers segments ventraux bisériés, sur les 3e et 4e segments unisériés.

♂. — Plus petit. Rostre plus court, plus fortement ponctué, sa dilatation apicale plus sensible. Bases de l'abdomen et du 5e segment légèrement impressionnées.

Long. 3.5-4 mm.

Bahia. Se développe dans les grains d'une Myrtacea (G. Bondar) connue sous le nom de «araçá de caboclo», Agua Preta, Bahia.

### Cholinae

#### *Solenopus Bondari*, n. sp.

Brun noir presque mat, orné d'un dessin squamuleux teinté de jaune et comprenant: sur le prothorax, une bande de chaque côté, latérale, se rétrécissant en avant; sur les élytres une large tache apicale, une bande transversale en arrière du milieu, de chaque côté légèrement oblique, dirigée en avant, à ses extrémités dilatée et prolongée sur le bord latéral jusqu'à la tache apicale le disque des élytres parsemé de nombreuses mais très petites taches, un plus serrées le long de la base; pattes et dessous à revêtement plus cendré, dense sur les côtés.

Rostre: ♂ aussi long que la tête et le prothorax, épais, peu arqué, mat, densément ponctué et en arrière avec cinq carènes; ♀ plus long, moins épais, plus arqué, en avant de l'insertion antennaire lisse, luisant, les points espacés. Tête ponctué, le front fovéolé. Funicule antennaire cendré, la massue noire, les deux premiers articles subégaux, le 2e aussi long que les 3e et 4e ensemble. Prothorax transversal, brusquement tubuleux et fortement rétréci en avant, les côtés arrondis; disque triangulairement impressionné entre les bandes, avec des granules écrasés espacés, la ligne médiane enfoncée, mate, sans granules; côtés en dehors de la bande et flancs pourvus de nombreux granules luisants. Ecusson plan, pointillé, glabre. Elytres allongés, en avant, fovéolés catenulés, les intervalles des fovéoles très élevés, étroits, luisants, les interstries très étroits, entre la bande et la tache apicale, ponctués, les interstries et la suture élevés densément et finement granulés. Sommet arrondi, le calus postérieur effacé. Fémurs fortement dentés. Tibias antérieurs bisinues en dedans. Bord postérieur du prosternum impressionné en arc, l'arc termine à ses extrémités par un tubercule obtus.

♂. Fémurs antérieurs et intermédiaires hérissés d'une longue pubescence cendrée, plus longue et plus touffue aux antérieurs. Excavation abdominale ovale, profonde, très grande, relevée sur ses bords, éparsément ponctué.

Long. 14-15 mm.



## Bahia (G. Bondar)

Cette espèce ressemble à *S. transversalis* Pasc. (Journ. Linn. Soc. Lond. XI, 1872, p. 475, t. 11, f. 4) dont le type figuré est un ♂.

*S. Bondari* est de taille moindre, de forme plus courte, les élytres plus convexes, la bande postérieure plus rapprochée de la tache apicale, l'intervalle distinctement et finement granulé, les côtés du prothorax sont granulés, chez le ♂ le rostre est moins long, moins arqué, les tibias antérieurs plus fortement bisinués en dedans. Ces deux espèces forment dans le genre un petit groupe bien distinct.

## Tachygoninae

*Tachygonus bauhinae*, n. sp.

Elytres d'un roux clair, le prothorax et la tête un peu plus foncés, les antennes, le rostre, les pattes antérieures et intermédiaires, les tarses postérieurs testacés, les fémurs postérieurs marrons, leurs tibias plus clairs, le dessous d'un brun noir. Pubescence dorsale dressée longue et jaune, les élytres sans tache.

Tête avec des points allongés, petits, assez serrés. Prothorax conique, plus large que long, les côtés devant la base parallèles sur une petite longueur, ensuite fortement convergents en avant; fortement convexe, en arrière avec d'assez gros points, assez espacés, serrés le long de la base, en avant plus petits, les intervalles lisses et luisants, la pubescence dressée moins longue que celle des élytres. Ecusson arrondi, glabre et lisse. Elytres subcordiformes, moins longs que larges, les épaules largement arrondies, les côtés arqués, au sommet largement arrondis; grossièrement fovéolés, les fovéoles oblongues et très serrées, les interstries étroits, linéaires, obsolètement granulés, leurs points sétigères. Genoux antérieurs et intermédiaires pourvus de quatre assez longues soies. Fémurs postérieurs en dessus grossièrement ponctués, fortement rugueux, leurs soies nombreuses et dressées, en dessous pourvus de quatre dents peu inégales. Tibias postérieurs graduellement mais très faiblement élargis, leur tranche interne lisse, l'externe avec trois petites aspérités.

Long. 2 mm.

Bahia.

Espèce caractérisée par la forme du prothorax, des fémurs et tibias postérieurs et par sa coloration. Elle se développe dans les feuilles de *Bauhinia integerrima* (G. Bondar)

*Tachygonus rugosipennis*, n. sp.

Noir luisant, les antennes, les pattes antérieures et intermédiaires, les 3e et 4e articles des tarses postérieurs jaunes. Elytres derrière l'écusson avec deux courtes linéoles suturales cendrées; dessous tomenteux blanc. Pubescence dorsale dressée d'un gris cendrée, entremêlée sur les élytres de quelques poils blancs, moins longs et soulevés.

Prothorax subconique, transversal, fortement convexe, luisant, sa ponctuation sur le disque espacée, le long de la base plus forte et serrée, derrière le bord antérieur moindre et peu régulièrement unisériée. Elytres subcordiformes, aussi larges que longs, impressionnés sous les linéoles scutellaires; grossièrement fovéolés sillonnés, les interstries dorsaux costiformes, étroits, transversalement découpés en petits tubercules. Genoux antérieurs pourvus seulement de 1-2 courtes soies. Fémurs postérieurs, en dessus, densément rugueux, granules, leur pubescence dressée serrée, en dessous de 4 dents, les 2 plus longues alternant avec les deux autres, ces dernières très courtes. Tibias postérieurs graduellement mais fortement élargis, vers leur tiers apical la tranche externe obliquement coupée; finement crénelés sur leurs deux bords, plus fortement sur l'interne.

Long. 2 mm.

Bahia (G. Bondar).

Cette espèce ressemble à *T. scutellaris* Kirsch; elle en diffère par l'absence de carène sur le prothorax, la sculpture plus forte des élytres, la conformation des tibia postérieurs.

*Tachygonus pullus*, n. sp.

Noir, luisant, les antennes, le rostre, les pattes antérieures et intermédiaires, la moitié basale des fémurs postérieurs et leurs tarses, jaunes. Pubescence dorsale dressée assez longue, entremêlée d'une pubescence moins longue et relevée. Elytres avec une tache postscutellaire tomenteuse, blanche. Dessous revêtu sur les côtés d'une dense pubescence tomenteuse blanche, débordant sur la marge des élytres et sur les flancs du prothorax. Rostre tomenteux à sa base.

Tête à ponctuation fine mais profonde et serrée. Prothorax subconique, plus large que long, les côtés en arrière légèrement arqués; convexe, devant l'écusson avec une courte impression criblée de gros points confluent, sur le disque

les points moindres mais serrés et alignés en deux séries transversales; luisant, la pubescence dressée rare et courte. Ecusson enfoncé, glabre. Elytres subcordiformes, à peine aussi longs que larges, la base de chaque côté sinuée, rebordée, jusqu'au 4<sup>e</sup> interstrie plus fortement rebordée, épaissie et lisse; grossièrement fovéolés, les fovéoles arrondies, profondes, en avant confluentes en sillons, en arrière étroitement séparées, les interstries très étroites, pourvus de points piligères à bords râpeux, les côtés, vus de haut, granulés râpeux. Genoux antérieurs et intermédiaires pourvus seulement de 1-2 soies, peu longues. Fémurs postérieurs en dessus rugueux, dans leur moitié apicale noirs et leur pubescence longue midressée, entremêlée de quelques poils plus longs et dressés, en dessous armés d'une dent assez forte. Tibias postérieurs graduellement et assez fortement dilatés.

Long. 1,2 mm.

Bahia (G. Bondar).

### Zygopinae

#### *Lechriops breviusculus*, n. sp.

Rhomboidal, noir, presque mat, les antennes, les tibias et les tarses ferrugineux. Revêtement dorsal réduit à quelques poils squamuleux blancs, sur les côtés du prothorax formant une fascie effilochée, sur les élytres ainsi disposés: quelques poils sur la base des interstries, sur le 3<sup>e</sup> plus nombreux et formant une courte linéole de 5-8 poils; sur la suture, en arrière du milieu une courte tache formée de deux courtes linéoles, près du sommet une courte linéole; sur le 8<sup>e</sup> interstrie un point blanc au niveau de la tache suturale. Dessous revêtu de squamules cendrées serrées.

Prothorax à ponctuation forte et serrée, caréné au milieu. Elytres à peine plus longs que larges, fortement striés ponctués, les interstries densément ponctués rugueux.

Long. 2 mm.

Guyane fr.: Cayenne, st. Laurent du Maroni; Brésil: Mato Grosso, Corumbá; Goyaz, Jatai; São Paulo; Bahia (G. Bondar) Bolivie; Paraguay, Hohenau.

Cette espèce est très voisine de *L. sciurus* F; elle en diffère principalement par les élytres plus courts et la taille moindre.

Observation. — La description de cette espèce fait partie d'un Mémoire comprenant une vingtaine d'espèces de *Lechriops*, autant

de *Lulechriops*, et d'autres petites espèces. Les dernières épreuves de ce Mémoire ont été revues, corrigées et renvoyées en juin 1938 à Prague où ce Mémoire devait être publié en septembre.

*Eulechriops ingae*, n. sp.

Rhomboidal, d'un noir brun, les antennes testacées, le rostre et les pattes d'un rouge ferrugineux, le bord apical des élytres marginé de roux. Orné en dessus d'un dessin blanc, composé de fins poils, comprenant sur le prothorax cinq bandes longitudinales de poils peu serrés, couchés, une bande apicale transversale reliant les bandes longitudinales et se prolongeant jusqu'aux hanches, la bande médiane étroite, les deux dorsales plus larges, à leur base élargies, ces trois bandes délimitant deux grandes taches dénudées, ovales; les deux bandes latérales non visibles de haut, brusquement arquées vers leur milieu et n'atteignant pas la base. Les élytres ornés de deux fascies transversales composées de linéoles étroites, leurs poils unisériés sur les interstries, la première fascie basale, étroite, la 2e postmédiane, sa linéole suturale se prolongeant jusqu'au sommet, ces deux fascies n'atteignant pas le bord marginal. Pattes revêtues d'une fine et dense pubescence blanche. Dessous revêtu de squamules ovales d'un blanc crayeux, serrées, très serrées et formant une tache sur les épisternes métathoraciques.

Rostre un peu moins long que le prothorax, modérément courbé, lisse, à sa base un peu élargi, éparsément pubescent. Yeux contigus, dans leur angle supérieur avec un point enfoncé. Tête glabre, alutacée. Antennes postmédianes, courtes, le 2e article du funicule à peine moins long que le 1er, les suivantes courts, ne s'épaississant que très peu, la massue ovale, courte. Prothorax peu plus large que long, subcylindrique, dans le milieu très peu élargi, la base fortement bisinuée un peu plus large que le bord antérieur; convexe, finement et densément ponctué. Ecusson petit, enfoncé, glabre. Elytres peu plus longs que larges, semi-ovales, largement arrondis au sommet, leur bord apical légèrement explané, roux; peu convexes, profondément striés ponctués, les interstries dorsaux étroits, moins larges que les stries, caréniformes, ponctués. Fémurs assez apais, ni dentés, ni carénés. Tarses assez allongés. Abdomen fortement convexe, brusquement ascendant à partir de la moitié postérieure du 2e segment. Episternes métathoraciques avec leur suture granulée.

Long. 2 mm.

Bahia. Se développe dans les gousses d'une légumineuse du genre *Inga* (G. Bondar). Les spécimens immatures ont les élytres et parfois même le prothorax bruns ou ferrugineux.

## Barinae

### *Elasmorhinus* Lac.

Ainsi que le supposait Lacordaire l'unique type du genre est une ♀. Le ♂ (coll. Pape, la mienne) en diffère par le prosternum armé de deux fortes épines séparées par un profond sillon, le rostre est beaucoup plus court, peu plus long que la tête et le prothorax, plus épais, subcylindrique, à la base légèrement comprimé latéralement, les antennes sont plus courtes et insérées un peu en arrière du milieu du rostre, par suite beaucoup plus antérieures, le prosternum quoique court est bien visible, le métasternum a un sillon médian. On voit que les différences sexuelles sont très notables, mais les deux sexes ont bien les autres parties du corps semblables. Ces mêmes différences se retrouvent chez l'espèce suivante. .

### *Elasmorhinus sulcirostris*, n. sp.<sup>1</sup>

Coloration plus foncée, d'un noir brun, la sculpture semblable à celle du génotype *El. longirostris* Lac. S'en distingue par le prothorax et surtout par les élytres visiblement plus courts, plus parallèles, en arrière plus brièvement rétrécis et plus largement arrondis au sommet. Taille moindre 4 (♂), 4,5 (♀) mm.

♂. — Comparé à celui de *longirostris*, moins long, un peu moins long que la tête et le prothorax (aussi long chez l'autre), son sillon dorsal plus long, commençant vers le tiers postérieur et se prolongeant jusqu'au-delà du milieu. Tibias antérieurs (chez l'unique spécimen étudié, peut être frotté) sans la frange de longue pubescence jaune interne qui se trouve chez le *longirostris*. Fovéole frontale plus distincte, petite mais profonde.

♀. — Rostre un peu moins long.

1) Plus longuement décrit dans la Révision des Barinae Sud Américains.

Chez les deux sexes les fémurs antérieurs sont en dessous finement dentés, et en outre râpeux chez le ♂ (caractère omis par Lacordaire).

Brésil: Bahia (G. Bondar); Bahia (Reed, British Museum).

## A Century of new American Thysanoptera. II.

by J. Douglas Hood, Cornell University, Department of Entomology, Ithaca, N. Y.

(With 11 figures)

### 18. *Sericothrips basilaris*, sp. nov.

Female (macropterous). — Length about 1.1 mm. (partially distended, 1.3 mm.). Color brown, darkest in pterothorax, along sides of abdomen, and in abdominal segments VII-IX, the posterior median portion of IX and all of X bright pale yellow, the head, thorax, and sides of abdomen with bright red internal pigmentation; pronotal dark blotch irregular and indistinct, its anterior margin arcuate, deeply concave, and sharply delimited by a heavy and nearly black apodeme; abdominal terga II-VII each with the heavily sclerotized antecosta black in color, that on II almost as heavy medially as at sides, those on III-VII paler medially but scarcely interrupted; pubescence very distinct, nearly black; coxae blackish brown, the remainder of legs gray-brown, excepting the yellow trochanters, tarsi, and the base and apex of the femora and tibiae; wings uniform dark brown, with the second sixth white; antennae with segments I and II nearly colorless, II narrowly edged with gray basally, III and IV pale grayish white, the former darkened with gray just beyond pedicel and again in the narrowed apex, IV similarly darkened in pedicel but with the narrowed apical portion much darker than that of III, segment V with pedicel dark gray-brown, abruptly grayish white just beyond, and shading to dark gray-brown in apical two-fifths, which is concolorous with segments VI-VIII.

Head (when horizontal) fully 1.7 times as wide as total median length, much broader across eyes than elsewhere, the cheeks rounded and strongly converging posteriorly; frontal

costa unusually broad (the interval between bases of antennae 39 microns), the bottom of its groove slightly convex; occipital line dark, heavy, marking the anterior margin of a deep groove behind eyes and ocelli; vertex transversely striate with very delicate lines which anastomose only slightly; head behind the smooth occipital groove rather heavily striate throughout with dark lines; setae approximately normal in disposition but larger than usual, the most anterior pair only 12 microns apart, the interocellars 42 apart and arising on a line with front margin of median ocellus, the postocellars 46 microns long, 73 apart, and arising directly behind the outer margins of posterior ocelli. Eyes very prominent and protruding, about 68 microns long, 50 wide, and 92 apart. Ocelli normal, 17 microns in diameter, the posterior pair about 17 apart. Antennae unusual in that segments III and IV are vasiform, with their apical portions strongly narrowed and parallel-sided; segment VI not pedicellate; sense-cones on III and IV of the typical U-shaped form.

Prothorax with the pronotum about 0.59 as long as transocular width of head and about twice as wide as long, the anterior margin of pronotal blotch impressed along the apodeme, pronotal sculpture consisting of fine dark lines, those in the pronotal blotch more or less parallel and 2-3 microns apart, those outside the blotch forming a conspicuous network of delicate reticles which are usually 6-7 microns across in the longitudinal direction; seta at posterior angles nearly black, about 68 microns long. Mesonotum transversely striate but with the lines of striation in its anterior portion only about 1 micron apart and so extremely close and fine as to be almost invisible (under a magnification of 430 diameters). Fore wings of the usual form, with 24-29 setae on costal portion of ambient vein and 31-16-17 on longitudinal vein, those at middle of wing (in each series) 50 microns long; two additional setae near tip of wing, in a series posterior to longitudinal vein; setae in dark areas of wing nearly black, the others pale. Legs normal; hind tibiae 202 microns long.

Abdomen normal; pubescence distinct, most of it nearly black, absent from median portion of the basal terga, except for a small patch near the base of each; setae on basal segments nearly black, those on IX and X pale yellowish brown; IX with seta I 65 microns, X with I 73 microns.

Measurements of female (holotype), in mm.: Length about 1.05 (partially distended, 1.28); head, total length 0.108, width across eyes 0.191, greatest width across cheeks 0.177; prothorax, median length of pronotum 0.113, width 0.221; pterothorax, width across anterior angles 0.216, greatest width 0.266; abdomen, greatest width (at segment IV) 0.340.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	23	43	66	62	46	53	14	15
Width (microns):	29	26	23	21	18	16	7	5
Total length of antenna, 0.322 mm								

CUBA: San Vicente, Pinar del Rio, July 8-9, 1940, Professor J. Chester Bradley, 1 ♀, from grass.

Readily known from all other New World species of the genus by the coloration of the wings.

10. *Anuphothrips (Neophysopus) nanus*, sp. nov.

Female (apterous). Length about 0.95 mm. (partially distended 1.0 mm.). Color straw-yellow, the abdomen not darkened apically; legs concolorous with body; antennae with segments I-III pale yellow and concolorous with body, IV lightly and indistinctly shaded with gray, V grayish yellow, shading to gray-brown in about apical fourth, VI-VIII gray-brown, VI paler basally; setae on last two abdominal segments pale yellow.

Head about as long as width across eyes and negligibly shorter than pronotum, the width across cheeks distinctly less; cheeks straight and nearly parallel; occiput with the usual widely-spaced cross-striae, which produce a distinct serration of the cheeks; cephalic setae small, normal in disposition, the interocellars about 12 microns long. Eyes about 0.5 as long as head, their dorsal length 51 microns. Ocelli wanting. Antennae typical of the subgenus; segment III with the trichome minute and simple, that on IV forked; VI with the trichome on inner surface about attaining middle of VII. Mouth-cone normal, extending about 66 microns beyond posterior dorsal margin of head when the latter is horizontal; maxillary palpi three-segmented.

Prothorax about 1.2 times as wide as long; pronotum nearly smooth, perfectly so at middle, with a few extremely faint striae anteriorly and posteriorly, without larger setae on posterior angles, the inner pair on posterior margin perhaps



longest and measuring about 10 microns. Pterothorax normal, with a few widely-spaced, indistinct cross-striae. Legs short, the hind tibiae about 93 microns long.

Abdomen about 1.6 times as broad as prothorax; comb on tergum VIII composed of irregular teeth, not interrupted medially; segment X completely divided dorsally; distal setae long and slender, IV with seta I 70, II 83, and III 84 microns long, X with seta I 73, II 63; ovipositor about 180.

Measurements of female (holotype), in mm.: Length about 0.95 (partially distended, 1.04); head, total length 0.103, width across eyes 0.106, least width behind eyes 0.093, greatest width across cheeks 0.099, least width near base 0.096; prothorax, median length of pronotum 0.107, greatest width 0.125; mesothorax, width across anterior angles 0.140; abdomen, greatest width (at segment IV) 0.200; tergum X, length 0.068, greatest subbasal width 0.052.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	16	29	30	27	31	43	10	15
Width (microns):	24	22	15	16	16	16	6	4
Total length of antenna, 0.201 mm.								

NEW YORK: Ithaca (South Hill), October 27, 1940, William F. Royce and J. D. H., 1 ♀, from grasses.

This tiny species is related to the European *gracillimus* and *debilis*, but differs conspicuously from both in that the comb on the eighth abdominal tergum is irregular and not composed of fine, even teeth.

## 20. *Chirothrips bradleyi*, sp. nov.

Female (macropterous). — Length about 1.5 mm. (partially distended, 1.6 mm.). Color of fully matured individuals blackish brown, head and abdomen darkest, the latter with segments IX and X nearly or quite black; legs about concolorous with body, the fore tibiae yellow at apex, all tarsi yellow; fore wings brownish gray, darker apically and at base; antennae with segments I and IV-VIII uniform blackish brown and concolorous with head, II yellowish brown, narrowly nearly black across base and along sides at base, III brownish yellow, about concolorous with lighter of II, very narrowly darkened along sides, its pedicel yellow; internal pigmentation orange-red.

Head with its total median length about 1.24 times its greatest width (the width across eyes slightly greater

than that across cheeks) and about two-thirds the length of pronotum; head greatly produced in front of eyes, the total length of the cephalic production (about 51 microns) nearly 0.4 that of head, its axial length between eyes and antennae about 24 microns, its sides nearly straight and somewhat diverging anteriorly (width at eyes 70 microns, near antennae 73 microns), its subtruncate tip narrow (least interval between antennae about 7 microns) and extending forward to within 5 or 6 microns of apex of segment I of antennae; surface of head with a few faint striae on occiput; vertex with two pairs of small setae just posterior to antennae; interocellar setae small, about 10 microns long, arising close to eyes and somewhat in advance of median ocellus, their interval 32-34 microns; three minute pairs of setae just behind eyes. Eyes about one-half the length of head, in holotype with dorsal length 68 microns. Ocelli normal, the median one smaller, about 9 microns in diameter and 67-82 microns from anterior end of head, the posterior pair with diameter 13 microns, interval 29 microns, and distance from anterior ocellus 18 microns. Antennae normal in general structure; segment I without transverse carina; II with axial length about 34 microns, length of outer surface 39 microns, maximum diagonal length 48 microns, distance from tip of projection to pedicel of III 20 microns, its inner surface very slightly convex, outer apical angle narrowly rounded and with a minute median seta near tip, outer surface slightly concave and with a minute distal seta; IV and V stout (see measurements); sense-cones on III and IV simple, stout, and about 11 and 12 microns long, respectively. Mouth-cone typical, broadly rounded, extending about 86 microns beyond posterior dorsal margin of head.

Prothorax about 1.1 times as broad as long and 1.5 times as long as head, its sides nearly straight; pronotum lightly sculptured at sides, virtually smooth medially; setae at posterior angles brown, the outer pair straight, outstanding, and about 47 microns long, the inner pair curved, somewhat appressed, and only 30 microns long, the other setae minute and scattered. Pterothorax normal; metascutellum a trifle more than twice as wide as long; mesosternum smooth, with five or six pairs of setae anteriorly. Legs normal; fore femora with dorsal apical margin distinctly reflexed, their sculpture heavy. Wings nearly straight, the fore pair usually

(and probably typically) with 4+3 setae near base of anterior vein and 1+1 beyond, near tip, the hind vein with 4 or 5.

Abdomen about 1.4 times as wide as prothorax, with the usual distinct, dark, nearly parallel, transverse lines of sculpture on dorsal surface, the ventral surface with indistinct transverse rows of scallops which produce a squamose appearance, sterna II-VI each with a dark subbasal and a dark subapical transverse line, the subapical one often interrupted medially and partially broken into scallops; subbasal chitinous line on terga dark, simple, scarcely broken into dashes; posterior margins of terga produced into a thin flange which is sometimes irregularly lobulate or dentate; posterior margins of sterna not produced, neither toothed nor lobed; segment X about 83 microns long and 66-70 microns wide at base, strongly tapering in basal and apical thirds and with the middle third parallel-sided; setae dark blackish brown or black, stouter than usual (fully 3 microns in diameter) but normal in disposition, segment IX with setae I-III about 66, 85, and 82 microns long, respectively, and X with I and II about 118 and 123 microns.

Measurements of female (holotype), in mm.: Length about 1.5 (partially distended, 1.6); head, total length 0.133, width across eyes 0.107, greatest width across cheeks 0.104; prothorax, median length of pronotum 0.200, width 0.224; mesothorax, width across anterior angles 0.252; metathorax, width posteriorly 0.227; abdomen, greatest width (at segment V) 0.315.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	26	34	29	28	23	29	13	12
Width (microns):	37	42	28	30	24	18	7	5
Total length of antenna, 0.191 mm								

NEW JERSEY: Northfield, September 22, 1939, Professor J. Chester Bradley, 2 ♀♀, from grass.

The dark color and the greatly produced head ally this striking species with Williams' *frontalis*, described from Argentina, of which two paratypes are before me. The slender antennae of *frontalis*, the peculiarly regular transverse sculpture of its pronotum and of the abdominal terga and sterna, as well as the equal, straight, major setae at the posterior angles of the prothorax and the slender pale setae of the last two abdominal segments, are perhaps the most conspicuous differences.

The present species is named after my good friend, its discoverer, Dr. J. Chester Bradley, who for many years has been adding to our knowledge of the Thysanoptera through persistent, discriminating collecting throughout Europe and the United States, as well as in Cuba.

21. *Dorcadothrips nevini*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (fully distended, 1.5 mm.). Color nearly uniform straw-yellow, the prothorax usually lightly shaded with gray, abdominal segments II-VI or II-VII with a lateral gray spot which is often prolonged mediad along the base on terga III-V; legs concolorous with body or with the fore and middle femora and tibiae very indistinctly shaded with gray; wings pale grayish yellow, distinctly shaded with gray in scale and along anterior margin at base and with a distinct, though not sharply delimited, gray cross-band in about the fourth ninth; antennae with segment I pale yellow, the remainder of antennae nearly uniform pale gray, excepting only the apex of segment II, basal one-half of III, and a narrow band just beyond the pedicels of IV and V, all of which are very pale and nearly colorless; ocellar pigmentation bright vermilion red.

Head moderately long (127-129 microns), nearly 0.9 the greatest width (143-146 microns), which is across eyes, the least width behind eyes (117-126) decidedly less, the greatest width across cheeks (128-131) just 0.9 the transocular width; cheeks narrowest opposite posterior dorsal margin of eyes, flaring anteriorly to them, where their width is equal to that at about basal third, roundly converging to base from this last point; head slightly produced between eyes and antennae, the axial length of this production about .7 microns, its greatest width about 70; frontal costa with a narrow, deep (6 microns), V-shaped notch; dorsum of head with a few pale moderately distinct transverse striae behind eyes, these producing a faint serration of the cheeks, the remainder of head perfectly smooth; interocellar setae long (51 microns), very slender apically, arising close together (13-17 microns), usually on a line with front margin of posterior ocelli; other cephalic setae smaller, comprising one pair about midway between median ocellus and inner, anterior margin of eyes, and three (or four) small postocular pairs, of which the outermost is nearly on the profile of cheeks. Eyes large and strongly protruding, prolonged posteriorly on dorsal surface

of head, their dorsal length about 70 microns, dorsal width 40, interval 63. Ocelli small (11-14 microns in diameter), close together (posterior ones about 30 microns apart), and posterior in position (posterior margin of median ocellus only slightly in front of middle of eyes). Antennae almost precisely as in genotype, excepting only that the trichomes on segments III and IV are V-shaped or (usually) Y-shaped, and that the one on VI extends to the apex of the segment.<sup>1</sup> Mouth-cone typical, broadly rounded apically; maxillary palpi with three (!) distinct segments.

Prothorax convex, along midline of pronotum 0.9 the length of head and contained about 1.5 times in its own greatest width (exclusive of coxae), broadest posteriorly, with rounded sides and straight anterior margin, its surface devoid of sculpture; setae yellow, very slender apically, and highly variable in length, the two pairs at posterior angles usually 60-70 microns long, the inner of the two pairs on posterior margin much longer than the outer and 33-52 microns long, midlaterals about 40. Legs normal. Fore wings ensiform, about 0.67 mm. long; costal portion of ambient vein with about 20 slender, brownish-yellow setae; anterior vein with 3 + 3 (or 3 + 4) setae at base and 2 near apex; posterior vein with 8-11.

Abdomen about 1.66 times as broad as prothorax, with sculpture only at sides; tergum X not divided dorsally; VIII without comb; intermediate sterna with the usual three pairs of major setae across posterior margin and with about four accessory setae in a row across middle; setae on segments IX and X bright yellow, the three pairs on IX about 84, 96, and 107 microns long, respectively, those on X 115 and 120; ovipositor about 245.

Measurements of female (holotype), in mm.: Length about 1.27 (fully distended, 1.46); head, total length 0.127, width across eyes 0.146, least width just behind eyes 0.126, greatest width across cheeks 0.131; prothorax, median length of pronotum 0.116, width (exclusive of coxae) 0.176; ptero-

<sup>1</sup>) It should be added that while the normal number of antennal segments is doubtless eight, it actually varies from seven to nine. The seven-segmented condition results from the partial or complete fusion of VII and VIII, and the nine-segmented condition is brought about by the appearance of a membranous ring just behind the apex of VI. The two extremes may be present in the same individual.

thorax, width across anterior angles 0.211, greatest width 0.245; abdomen, greatest width (at segment IV) 0.293.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	24	39	53	62	46	63	13	28
Width (microns):	30	28	20	20	17	16	8	6
Total length of antenna, 0.328 mm.								

Male (apterous). — Virtually identical with female in color, and agreeing closely in general structure; abdominal terga distinctly sculptured medially, with widely-spaced transverse striae which are largely broken into dashes; sterna III-VII each with a transversely elliptical glandular area near middle, the accessory setae irregularly arranged behind them; tergum IX with the dorsal processes about 97 microns long, curving outwardly and downwardly, their inner edge convex throughout distal one-half or more and thus not sigmoid, each with a very minute seta on inner surface at base.

Measurements of male (mostly of allotype), in mm.: Length about 1.02 (fully distended, 1.23); head, total length 0.098, width across eyes 0.119, least width just behind eyes 0.097, greatest width across cheeks 0.105; eyes, dorsal length 0.053, dorsal width 0.031, dorsal interval 0.057; median ocellus, diameter 0.007; posterior ocelli, diameter 0.006, interval 0.032; interocellar setae, length 0.039, interval 0.020; prothorax, median length of pronotum 0.099, greatest width (exclusive of coxae) 0.158; outer pair of setae at posterior angles, length 0.048, inner 0.053, inner pair on posterior margin 0.034; pterothorax, width across anterior angles 0.181, greatest width 0.192; abdomen, greatest width (at segment IV) 0.221.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	22	37	46	49	38	58	14	25
Width (microns):	29	26	17	18	16	16	9	6
Total length of antenna, 0.289 mm.								

NEW YORK: Tompkins Co. (Ringwood), October 1 and 4, 1940, Dr. F. Reese Nevin, 21 ♀ and 16 ♂♂, from grass (holotype and allotype taken Oct. 4).

From *cuespitis*, the genotype and only known member of the genus, described from Egypt, this striking species differs only slightly. The head is seemingly different in shape, to judge from the description, in the present species being more narrowed behind eyes, which are more strongly protruding; the antennae are darker in color, and bear trichomes which are Y-shaped instead of U-shaped; the number of segments in

the maxillary palpi is undeniably three, instead of two; and the horn-like processes on the ninth abdominal tergum of the male are differently formed.

The species is named after Dr. F. Reese Nevin, of Cornell University, who is not only to be credited with the discovery of several other new Thysanoptera, but who, to date, has taken all of the known specimens of the present form.

22. *Thrips nubilans*, sp. nov.

Female (brachypterous). — Length about 1.1 mm. (fully distended, 1.4 mm.). Head and thorax brownish yellow, shaded with brown, abdomen dark blackish brown at base and nearly black apically; head darker than prothorax, shaded brown across front and base, and more darkly so along cheeks; prothorax with a number of small brown clouds which coalesce to form a marking which is roughly H-shaped; pterothorax yellow in the membranous area and brownish yellow in mesosternum, the other sclerites brown; coxae dark brown, remainder of legs brownish yellow, with femora and tibiae clouded on outer surface with brown; fore wings pale yellowish, with dark brown setae; antennae with segments I, III and IV pale brown, IV darker than III and shaded apically with darker, III nearly colorless basally, segments II and V-VII dark brown, II not paler than the apical segments but narrowly and rather abruptly yellow across apex, V paler in about basal half; ocellar pigmentation bright red.

Head moderately long, its greatest width only 1.1 times its median length, negligibly broader across middle of cheeks than across eyes, slightly produced (about 3 microns) in front of eyes; cheeks evenly arched, curving to eyes and more distinctly to base, with about six strong cross-striae on occiput, these producing a strong serration in posterior part of cheeks; frontal costa narrowly, but rather deeply, notched; cephalic setae small and pointed, the interocellars about 24 microns long, postocellars about 21. Eyes about 0.55 as long as head, their dorsal length 67 microns, width 45, interval 45 (in holotype). Ocelli small, 9 microns in diameter, the posterior pair about 23 microns apart and 16 microns from median ocellus, their front margin distinctly behind middle of eyes. Antennae moderately stout, slightly more than twice the length of head, normal in structure; segment III about 2.1 times as long as wide, VII about one-third as long as VI. Mouth-cone moderately short, extending about 76 microns

beyond posterior dorsal margin of head when the latter is horizontal; maxillary palpi three-segmented, as usual.

Prothorax normal, about 1.4 times as wide as median length, with distinct pale cross-lines of sculpture throughout; setae at posterior angles dark brown, not paler apically, the outer pair 53 microns long, inner 57; posterior margin probably with three pairs of setae normally, the mediad pair larger and about 25 microns long. Fore wings about 93 microns long.

Abdomen of normal form; sterna without accessory setae; tergum VIII without comb; apical setae nearly black, not paler apically, long and slender, seta I on IX 103 microns, II 108, III 111; seta I on X 88, II 84.

Measurements of female (holotype), in mm.: Length about 1.12 (fully distended, 1.37); head, total length 0.123, width across eyes 0.136, least width just behind eyes 0.130, greatest width across cheeks 0.136, least width at base 0.124; prothorax, median length of pronotum 0.124, width 0.174; pterothorax, width across anterior angles 0.196; abdomen, greatest width (at segments IV-V) 0.277.

Antennal segments:

Length (microns): 24 39 44 37 34 50 22

Width (microns): 31 26 21 20 19 20 7

Total length of antenna, 0.250 mm.

NEW YORK: Ithaca (South Hill). October 27, 1940, William F. Royce and J. D. H., 2 ♀♂, from grasses.

The coloration of this species is distinctive

### 23. *Leptothrips singularis*, sp. nov.

Female (macropterous). — Length about 1.8 mm. (fully distended, 2.3 mm.). Color dark brown, more or less blackish, with prothorax abruptly paler and (in fresh specimens) dull orange in color because of the peculiarly pale internal pigmentation; all tibiae dark gray-brown in basal half or third, remainder of legs brownish yellow to pale brown and mottled with darker; wings colorless; antennae brown, usually somewhat darker in segments VII and VIII, with apex of II and basal half of III paler and yellowish.

Head scarcely 1.7 times as long as greatest width across cheeks, which is behind the middle, the width across eyes negligibly less; cheeks slightly rounded, distinctly not-



ched at posterior angles of eyes and noticeably narrowed to base, the least width near base about 0.85 the width across eyes; vertex roundly produced as usual, overhanging, and bearing the forwardly-directed median ocellus at its extremity; most of head posterior to eyes distinctly cross striate; post-ocular setae pale, slender, and sharply pointed, their length about 23 microns, interval 110, distance from nearest facet of eyes 18. Eyes typical in general structure, 73 microns long dorsally, about 47 in width, and 60 apart, not produced ventrally. Ocelli 15-16 microns in diameter, the posterior pair about 33 apart and 25 from median ocellus. Antennae normal in general structure, segment VI about 0.72 as long as IV; sense-cone formula: III 0-1, IV, 1-1, V and VI 1-1<sup>+</sup>, VIII 1 dorsal. Mouth-cone typical, extending about 70 microns beyond posterior dorsal margin of head.

Prothorax about 0.52 the length of head, smooth medially, distinctly striate laterally, with an impressed line between the postero-marginal setae; major setae pale yellow, the epimerals slightly dilated and divided at tip and 33-35 microns long, the postero-marginals about 16 microns long and nearly or quite pointed, the other setae minute. Pterothorax normal, meso- and metanota with the usual fine striations. Legs normal. Fore wings thoroughly typical, about 0.89 mm. long, with 3-4 accessory setae, the subbasal setae nearly colorless, I and II with dilated, divided tips and 20-23 microns long, III pointed and about 44 microns.

Abdomen typical, broadest at segment IV; major setae yellowish or pale brown, seta I on segment IX 116 microns, II 140, III 76. Tube (segment X, only) about 0.4 the length of head and 1.6 times as long as greatest subbasal width, which is about 1.8 times the apical width, its sides straight.

Measurements of female (holotype), in mm.: Length about 1.79 (fully distended, 2.32); head, total length 0.258, width across eyes 0.154, least width just behind eyes 0.146, greatest width across cheeks 0.156, least width near base 0.132, prothorax, median length of pronotum 0.133, width (inclusive of coxae) 0.245; pterothorax, width across anterior angles 0.260; abdomen, greatest width (at segment IV) 0.286; tube (segment X, only), length 0.107, greatest subbasal width 0.066, least apical width 0.036.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	36	52	60	61	51	44	44	35

Width (microns): 33 27 23 30 30 27 23 16

Total length of antenna, 0.383 mm.

Male (macropterous). — Identical with female in color, but with head, antennae, and abdomen more slender.

Measurements of male (allotype), in mm.: Length about 1.37 (fully distended, 1.67); head, total length 0.221, width across eyes 0.138, least width just behind eyes 0.127, greatest width across cheeks 0.136, least width near base 0.120; eyes, dorsal length 0.075; median ocellus, diameter 0.016; posterior ocelli, diameter 0.015, interval 0.030; distance from median ocellus 0.023; postocular setae, length 0.020, interval 0.097, distance from eyes 0.013; mouth-cone, length beyond posterior dorsal margin of head 0.073; prothorax, median length of pronotum 0.117, greatest width (inclusive of coxae) 0.224; pterothorax, width across anterior angles 0.223; fore wings, length 0.714; abdomen, greatest width (at segment III) 0.190; tube (segment X, only), length 0.103, greatest subbasal width 0.055, least apical width 0.032; seta I on segment IX 0.100, II 0.013 (!), III 0.140; terminal setae 0.120.

Antennal segments: 1 2 3 4 5 6 7 8

Length (microns): 33 45 56 57 50 43 43 34

Width (microns): 28 24 22 27 27 55 22 14

Total length of antenna, 0.361 mm

FLORIDA: Homestead, April 2, 1938, Professor J. Chester Bradley, 1 ♀ and 4 ♂♂ (including holotype and allotype), from «flowers and foliage of *Metopium toxiferum*; some from Long-leaved Pine.» Pine Key, April 4, 1938, Dr. Bradley and J. F. Bradley, 2 ♀♀ and 1 ♂, from living Long-leaved Pine.

This is the only known species of *Leptothrips* in which the prothorax is pale.

#### 24. *Hoplothrips aciculatus*, sp. nov.

Male (apterous). — Length about 1.13 mm. (partially distended, 1.28 mm.). Color of thorax and first two or three abdominal segments chestnut-brown, the head bright lemon-yellow but shaded with brown across base and narrowly so along sides, the abdomen fading to brownish yellow in segment VIII and to lemon-yellow in basal two-thirds of tube, the apical portion of tube gray-brown, segment IX heavily

shaded with brown; tarsi, tibiae, and apical two-thirds of fore-femora bright lemon-yellow, the base of fore femora brown, the middle and hind tibiae lightly shaded with brown, the middle and hind femora dark brown with yellow tips; antennae with segments I and II yellow, III yellow at base, shading to dark brown in apical half or more, IV-VIII dark brown; internal pigmentation red, present in the darker parts of the body and in the ocellar region, absent from appendages.

Head 1.3 times as long as greatest width across cheeks and about 1.4 times that across eyes, the width just behind eyes distinctly less; cheeks nearly parallel; head with a few faint lines of sculpture on vertex and cheeks, and several distinct anastomosing lines across dorsum in the darkened area; postocular setae yellow, slightly dilated and divided at tip, approximately 50 microns long and 105 apart, arising close to sides of head and about 12 microns behind eyes; all other cephalic setae minute, pale and pointed; vertex rounded, not produced, not elevated, and not overhanging. Eyes small, somewhat protruding, coarsely faceted, with about three facets in lateral profile, their length (38 microns) about 0.23 that of head. Ocelli wanting. Antennae normal, segment VIII with a much-narrowed pedicel; sense-cones slender, straight, pointed, and disposed as follows on the inner (and outer) surfaces of segments: III 1 (1), IV 1 (1), V 1 ( $1\frac{1}{2}$ ), VI 1 ( $1\frac{1}{2}$ ), VII 1 dorsal. Mouth-cone semicircularly rounded at tip, extending about 73 microns beyond posterior dorsal margin of head.

Prothorax along median line of pronotum about 1.13 times the length of head and contained in the trans-coxal width about 1.6 times, with a prominent, black, nearly complete, median apodeme, its dorsal surface wholly without sculpture save for a few faint, transverse, anastomosing lines on the downwardly-sloping, extreme posterior margin; anteromarginal setae extremely minute, the others brown, slightly dilated apically, and minutely divided at tip, the anteromarginals 38 microns long, midlaterals 53, epimerals 46, postermarginals 52, coxals 40. Pterothorax much narrower than prothorax across coxae. Wings wanting. Fore femora enlarged and curved, their inner margin strongly concave, apex with two stout teeth, one on the inner surface, the other ventral; fore tibiae with a ventral tooth near middle

of inner surface; tarsal tooth large, slightly curved, nearly triangular.

Abdomen moderately small, broader than pterothorax, but only 0.9 the trans-coxal width of prothorax; dorsal surface virtually free of sculpture except for 6-8 more or less regular transverse rows of small sharp tubercles on terga VII and VIII, and a few much smaller, similar ones on tergum IX; major setae brown or yellow, the more basal ones darker, most of them somewhat dilated and divided at tip, the three pairs on IX pointed and respectively 60, 32, and 70 microns long, the middle pair of these darkest and stoutest, the lowermost pair much the slenderest and palest. Tube (segment X, only) about 0.44 the length of head and 1.4 times as long as greatest subbasal width, the latter 1.8 times the apical width, broadest at about basal fourth, its sides nearly straight and evenly tapering in apical three-fourths; terminal setae brown, about 110 microns long.

Measurements of male (holotype), in mm.: Length about 1.13 (fully distended, 1.28); head, total length 0.164, width across eyes 0.116, least width just behind eyes 0.113, greatest width across cheeks 0.126, least width near base 0.123; prothorax, median length of pronotum 0.185, width (inclusive of coxae) 0.301; pterothorax, width across anterior angles 0.235; abdomen, greatest width (at segment III) 0.277; tube (segment X, only), length 0.073, greatest subbasal width 0.053, least apical width 0.029.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	35	42	45	37	38	35	32	36
Width (microns):	35	28	28	30	28	26	23	16
Total length of antenna, 0.300 mm.								

FLORIDA: Clearwater, December 24, 1937, J. D. H., 1 ♂, from dead brush.

This distinct little species finds its only close North American relative in *flavicauda*, but may readily be known from that species, in the male sex, by the abdominal character which has suggested the specific name, — a character which will of course be wanting in the female.

## 25 *Eurythrips disjunctus*, sp. nov.

Female, forma macroptera. — Length about 1.4 mm. (fully distended, 1.8 mm.). Color of head, thorax, and abdomen brown, the abdomen shading to blackish brown in the

last few segments, the tube paler apically and basally, the head shaded with dark blackish brown or black at sides; internal pigmentation red, absent from head save in the ocellar region; legs brownish yellow, with the femora and tibiae shaded with brown; wings dark brown, the fore pair mottled with darker apically, their second fourth with a darker median line in front of which the membrane is paler, their posterior margin with a small elongate colorless area beyond scale; antennae brown, darkest in segments III-VIII, segment III with base yellow and second quarter darkest; all major setae nearly colorless, lightly yellowish or brownish basally.

Head about 1.3 times the greatest width across cheeks and about 1.55 times the width across eyes, its form and chaetotaxy almost identical with that of genotype; cheeks rounded, strongly converging to eyes and only slightly to base, often with a lateral tubercle, or even a sharp tooth, behind eyes; head smooth and shining, excepting for the faintly subreticulate vertex and a few indistinct striae at base; postocular setae colorless, distinctly dilated and divided at tip, about 54 microns long, 86 apart, and 13 from nearest facet of eyes; other cephalic setae small or even minute, all pointed and pale; vertex and occiput somewhat elevated, the former distinctly produced and somewhat overhanging. Eyes rounded, strongly protruding, moruloid, and coarsely faceted, about 0.28 the length of head, measuring 50 microns in dorsal length, 33 in width, their interval 51. Ocelli about 14 microns in diameter, the median one at tip of vertex, directed forward, and with its posterior margin about 14 microns in front of anterior margin of eyes, the posterior ones about 28 microns apart. Antennae almost identical with those of genotype, excepting that segment VII is not at all closely united with VI, its pedicel only slightly broadened at base; all major setae pointed; sense-cones slender and pointed as follows on the inner (and outer) surfaces of the segments: III 1 (1), IV 1 (2), V 1 (1<sup>+</sup>), VI 1 (1<sup>+</sup>), VII 1 dorsal. Mouth-cone short and broadly rounded, extending about 82 microns beyond posterior dorsal margin of head when the head is strictly horizontal.

Prothorax along median line of pronotum about 0.6 the length of head and contained in the trans-coxal width about twice, its dorsal surface without sculpture; epimeron largely fused with pronotum; major setae nearly colorless, the

antero-marginals minute (about 10 microns long) and pointed, the others dilated and divided at tip, the antero-angulars and midlaterals 36-50 microns long, epimerals 60-77, postero-marginals 63-79, coxals 33-53. Pterothorax about equal in width to prothorax, without ventro-lateral knobbed setae. Legs not reticulate, fore tarsi unarmed. Wings straight and of nearly equal width throughout, the fore pair 585 microns long in holotype, 66 microns broad subapically, without accessory hairs, and with the three subbasal setae dilated apically and respectively 38, 57, and 60 microns long.

Abdomen moderately large and heavy, about 1.3 times as broad as prothorax across coxae; dorsal surface almost perfectly smooth; most major setae, excepting the terminal and wing-retaining ones, and those on segment IX, similar to postoculars and prothoracics, the lateral seta on VII 90-114 microns, the three pairs on IX 112-126, the terminal ones 100. Tube (segment X, only) 0.6-0.7 the length of head, 1.6-1.7 times as long as greatest subbasal width, the latter about twice the apical width, broadest across basal collar, its sides straight or very slightly concave in apical three-fourths.

Measurements of macropterous female (topotypic paratype, caustic-treated), in mm.: Length about 1.39 (fully distended 1.79); head, total length 0.180, width across eyes 0.116, least width just behind eyes 0.104, greatest width across cheeks 0.137, least width near base 0.130; prothorax, median length of pronotum 0.108, width (inclusive of coxae) 0.256; mesothorax, width across anterior angles 0.252; abdomen, greatest width (at segment IV) 0.328; tube (segment X, only), length 0.103, greatest subbasal width 0.066, least apical width 0.034.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	44	54	58	57	51	53	43	29
Width (microns):	37	31	29	28	27	25	22	14
Total length of antenna, 0.392 mm.								

Female, forma brachyptera. — Head, prothorax, and legs yellow, the prothorax lightly shaded along sides and with bright vermilion internal pigmentation, the pterothorax yellowish brown and shaded with darker brown laterally, the abdomen wholly brown, gradually darker toward apex, the last few segments blackish brown but with the tube paler apically and basally; antennae with the first two segments

yellow, shaded with brown, the narrow basal part of the third bright yellow, the remainder of antenna dark gray-brown. Structure almost as in the macropterous form, save for the reduction of the wings to small, elliptical pads about 53 microns in length and 30 in width, each with three long (45 microns), apically-dilated setae.

Measurements of brachypterous female (topotypic paratype, caustic-treated), in mm.: Length about 1.4 (fully distended, 1.8); head, total length 0.182, width across eyes 0.119, least width just behind eyes 0.106, greatest width across cheeks 0.146, least width near base 0.139; eyes, dorsal length 0.046, dorsal width 0.033, dorsal interval 0.054, ventral length 0.043, ventral width 0.027, ventral interval 0.066; post-ocular setae, length 0.066, interval 0.090, distance from eyes 0.016; mouth-cone, length beyond posterior dorsal margin of head 0.114; prothorax, median length of pronotum 0.137, greatest width (inclusive of coxae) 0.269; antero-angular setae, length 0.053, midlaterals 0.056, epimerals 0.056, postero-marginals 0.070, coxals 0.040; pterothorax, width across anterior angles 0.263; abdomen, greatest width (at segment III) 0.382; tube (segment X, only), length 0.112, greatest subbasal width 0.074, least apical width 0.036; seta I on segment IX, length 0.112, II 0.107, III 0.103; terminal setae 0.102.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	45	54	60	61	57	51	43	31
Width (microns):	41	33	32	30	27	26	24	13
Total length of antenna, 0.402 mm								

Male (brachypterous). — Nearly identical in coloration and structure with brachypterous female, though smaller and more slender; fore tarsal tooth wanting; sternum VIII of abdomen with the glandular area in the form of a broad band across the middle of the segment, occupying about one-half the length of the segment and all of its width save for the area of attachment of the tergo-sternal muscles.

Measurements of male (allotype), in mm.: Length about 1.09 (fully distended, 1.28); head, total length 0.148, width across eyes 0.109, least width just behind eyes 0.099, greatest width across cheeks 0.125, least width near base 0.123; postocular setae, length 0.053, interval 0.083, distance from eyes 0.018; mouth-cone, length beyond posterior dorsal margin of head 0.087; prothorax, median length of pronotum 0.115, width (inclusive of coxae) 0.213; antero-angular

setae, length 0.043, midlaterals 0.042, epimerals 0.052, postero-marginals 0.054, coxals 0.039; mesothorax, width across anterior angles 0.207; abdomen, greatest width (at segment IV) 0.272; tube (segment X, only), length 0.097, greatest sub-basal width 0.063, least apical width 0.032; seta I on segment IX, length 0.108, II 0.040, III 0.110.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	39	47	51	49	49	46	38	27
Width (microns):	37	28	27	25	24	24	22	13
Total length of antenna,	0.346.							

NEW YORK: Connecticut Hill (Tompkins Co.), August 4 and 30, 1940, Dr. F. Reese Nevin, and September 29, 1940, Dr. Nevin and J. D. H., 9 macropterous ♀♀, 30 brachypterous ♀♀, and 19 ♂♂ (holotype and allotype taken August 4). Enfield Glen State Park (Tompkins Co.), September 22, 1940, Dr. Nevin and J. D. H., 3 brachypterous ♀♀ and 2 ♂♂. Ithaca. August 29, 1940, Dr. Nevin, 1 brachypterous ♀.

VIRGINIA: Amherst, 26, 1940, Dr. Lincoln C. Pettit, 2 brachypterous ♀♀ and 1 ♂. Buena Vista, October 26, 1940, Dr. Pettit, 1 ♂. Lexington, October 15, 1940, Dr. Pettit, 5 brachypterous ♀♀. Natural Bridge, November 16, 1940, Dr. Pettit, 5 brachypterous ♀♀ and 4 ♂♂.

TEXAS: Palacios, March 25, 26, and 28, 1939, J. D. H., 8 brachypterous ♀♀ and 1 ♂.

This common species has been taken only on grasses. It may readily be known from the others which have at most a small tarsal tooth by the apically-dilated setae, short tube, and narrow pedicel of the seventh antennal segment.

## 26. *Eurythrips tristis*, sp. nov.

Female, forma macroptera. — Length about 1.3 mm. (fully distended, 1.7 mm.). Color of head, thorax, and abdomen brown, the abdomen shading to blackish brown in the last few segments, the tube paler apically, the head shaded with dark blackish brown or black at sides; internal pigmentation red, almost or quite absent from head, save for the ocellar region; legs largely dark brown, with all trochanters, tarsi, and tips of tibiae bright pale yellow, the fore tibiae paler than the others, the fore femora pale apically; wings dark brown basally, fading to pale brown in about middle



third, darker again apically; antennae brown, paler in three or four basal segments, shading to dark gray-brown in segments VII and VIII; segment III with base yellow; all major setae brownish yellow.

Head relatively short, about 1.2 times as long as greatest width across cheeks and only 1.3 times the width across eyes, distinctly less narrowed behind eyes than in genotype, its chaetotaxy normal; cheeks rounded, but only slightly more converging to eyes than to base; head smooth and shining, excepting for a few faint lines on vertex and on sides at base; postocular setae long, somewhat dilated and divided at tip, about 73 microns long and 107 apart; other cephalic setae pale and pointed, the occipitals about 23 microns long; vertex and occiput somewhat elevated, the former distinctly produced and very slightly overhanging. Eyes rounded, less strongly protruding, less coarsely faceted, and less moruloid than usual, about 0.29 the length of head, measuring 48 microns in dorsal length. Ocelli 16-17 microns in diameter, the median one at tip of vertex, directed upward as well as forward, and with its posterior margin about 2 microns only in front of anterior margin of eyes, the posterior ones about 25 microns apart. Antennae somewhat stouter than usual, but otherwise typical, segment VII not at all closely united with VI, its pedicel not broadened at base; all major setae pointed; sense-cones slender and pointed, disposed as follows on the inner (outer) surfaces of segments: III 1 (1), IV 1 (2), V 1 (1), VI 1 (1<sup>+</sup> 1), VII 1 dorsal. Mouth-cone short and broadly rounded, extending about 80 microns beyond posterior dorsal margin of head when the latter is strictly horizontal.

Prothorax along median line of pronotum about 0.7 the length of head and contained in the trans-coxal width about twice, its dorsal surface without sculpture except for a few faint lines along posterior margin; epimeron largely fused with pronotum; antero-marginal setae minute (about 10 microns long) and pointed, the others slightly dilated and distinctly divided at tip, the antero-angulars of holotype 57 microns long, midlaterals 86, epimerals 93, postero-marginals 103, coxals 53. Pterothorax about equal in width to prothorax, without ventro-lateral knobbed setae. Legs not reticulate, fore tarsi with a small but distinct tooth at apex of first segment. Wings straight and of very nearly equal width throughout, the fore pair 672 microns long in holotype,

58 microns broad subapically, without accessory hairs, and with the three subbasal setae usually dilated apically and respectively 53, 51, and 56 microns long.

Abdomen moderately large and heavy, about 1.25 times as broad as prothorax across coxae; dorsal surface almost smooth; major setae very long, most of them pointed, the lateral one on VII 144 microns, the three pairs on IX respectively 183, 196, and 144, the terminal ones 130. Tube (segment X, only) 0.8 the length of head and twice as long as greatest subbasal width, the latter twice the apical width, broadest across basal collar, its sides straight and evenly tapering in apical three-fourths.

Measurements of macropterous female (holotype), in mm.: Length about 1.31 (partially distended, 1.55); head, total length 0.167, width across eyes 0.129, least width just behind eyes 0.122, greatest width across cheeks 0.138, least width near base 0.131; prothorax, median length of pronotum 0.123, width (inclusive of coxae) 0.245; mesothorax, width across anterior angles 0.249; abdomen, greatest width (at segment III) 0.307; tube (segment X, only), length 0.133, greatest subbasal width 0.066, least apical width 0.033.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	39	50	49	44	47	47	41	36
Width (microns):	37	30	28	29	28	25	23	15
Total length of antenna, 0.353 mm.								

Female, forma aptera. — Color and structure much as in macropterous form, except that the head is paler than rest of body and distinctly yellowish (though shaded, at least at sides, with brown), the tube only slightly paler apically, and the antennae slightly paler basally.

Measurements of apterous female (topotypic morphotype), in mm.: Length about 1.4 (fully distended, 1.7); head, total length 0.177, width across eyes 0.134, least width just behind eyes 0.127, greatest width across cheeks 0.151, least width near base 0.141; eyes, dorsal length 0.047; post-ocular setae, length 0.071, interval 0.114; mouth-cone, length beyond posterior dorsal margin of head 0.080; prothorax, median length of pronotum 0.143, greatest width (inclusive of coxae) 0.273; antero-angular setae, length 0.066, midlaterals 0.073, epimerals 0.083, postero-marginals 0.087, coxals 0.057; pterothorax, width across anterior angles 0.258; abdomen, greatest width (at segment III) 0.368; tube (segment X, only),

length 0.141, greatest subbasal width 0.076, least apical width 0.036; seta I on segment IX, length 0.192, II 0.190, III 0.154; terminal setae 0.132.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	40	50	50	46	47	49	42	35
Width (microns):	40	32	30	33	30	27	26	16
Total length of antenna, 0.359 mm.								

Male (apterous). — Nearly identical in coloration and structure with apterous female, though smaller and more slender; fore tarsal tooth as in female; sternum VIII of abdomen with the glandular area in the form of a broad band across the middle of the segment, occupying about 0.6 the length of the segment and all of its width save for the area of attachment of the tergo-sternal muscles.

Measurements of male (allotype), in mm.: Length about 1.22 (fully distended, 1.49); head, total length 0.161, width across eyes 0.123, least width behind eyes 0.117, greatest width across cheeks 0.134, least width near base 0.121; post-ocular setae, length 0.076, interval 0.098; mouth-cone, length beyond posterior dorsal margin of head 0.075; prothorax, median length of pronotum 0.127, width (inclusive of coxae) 0.258; antero-angular setae, length 0.047, midlaterals 0.060, epimerals 0.086, postero-marginals 0.088, coxals 0.055; mesothorax, width across anterior angles 0.228; abdomen, greatest width (at segment III) 0.293; tube (segment X, only), length 0.118, greatest width near base 0.066, least apical width 0.033; seta I on segment IX, length 0.178, II 0.073, III 0.168.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	46	44	41	41	46	42	34
Width (microns):	37	30	28	29	28	25	23	15
Total length of antenna, 0.334 mm.								

NEW YORK: Oswegatchie, September 9, 1940, J. D. H., 3 macropterous ♀♀, 5 apterous ♀♀, and 4 ♂♂ (including holotype and allotype). Apulia Station, October 11, 1940, Dr. F. Reese Nevin and J. D. H., 1 apterous ♀. Warrensburg, October 12, 1940, William F. Royce, 3 apterous ♀♀. All material was taken from dead grass.

The closest North American relatives of this species are *harti* and *hindsii*, from both of which it differs most conspicuously in the darker color, the form of the head, and the apically-divided setae.

27. *Eurythrips watsoni*, sp. nov.

Female (brachypterous). — Length about 1.1 mm. Color bright yellow, with segment IX of abdomen heavily shaded with brown laterally and posteriorly, X (the tube) dark brown but paler apically and basally, the intermediate abdominal segments each with a transverse, subbasal, median brown spot; internal pigmentation usually opaque (probably always so in fresh specimens), orange-yellow by reflected light, usually dark gray or black by transmitted light (rarely, brown and not opaque), absent from all of head except the ocellar region, in abdomen forming a band near either side; legs uniform bright yellow; antennae light brown in general color, segments I and II somewhat paler than the others, the apical ones darker, II shaded apically with light brown, III yellow in basal half or more; all setae pale, yellowish in color, the terminal ones only slightly darker.

Head relatively short, its length a little more than 1.2 times the greatest width across cheeks and nearly 1.5 times the width across eyes; cheeks rounded, strongly converging to eyes and only slightly toward base, with a sharp tooth on profile behind eyes; vertex, sides, and base of head distinctly subreticulate with pale lines which produce a very distinct serration of the cheeks; postocular setae distinctly dilated at tip, about 63 microns long, 95 apart, and 17 from nearest facet of eyes; occipital setae minute, slender, pointed, about 22 microns long, 48 apart, and 70 from base of head; vertex and occiput slightly elevated, the former subconical, slightly produced, and slightly overhanging. Eyes rounded, strongly protruding, coarsely faceted, about 0.22 the length of head, measuring 41 microns in dorsal length, 31 in width, their interval 64. Ocelli present, the median one with its anterior margin about 13 microns in advance of that of eyes. Antennae more slender than usual, otherwise almost identical with those of its closest allies, all major setae pointed, none of the segments reticulate; sense-cones slender, pointed, and nearly straight, disposed as follows on the inner (and outer) surfaces of the segments: III 1 (1), IV 1 (2), V and VI 1 (1<sup>+</sup>1), VII 1 dorsal. Mouth-cone moderately large, broadly rounded, extending about 84 microns beyond posterior dorsal margin of head.

Prothorax along median line of pronotum about 0.63

the length of head and contained in the trans-coxal width about twice; dorsal surface without sculpture; epimeron largely fused with pronotum; antero-marginal setae minute and pointed, the others distinctly dilated at tip, antero-angulars and midlaterals 57-58 microns long, epimerals 68, postero-marginals 70, coxals 45. Pterothorax narrower than prothorax, without ventro-lateral knobbed setae. Legs striate, not reticulate, fore tarsi with a very minute, downwardly-directed tooth at apex of first segment. Wings about 63 microns long, each fore one with two apically dilated setae which are about 57 microns in length.

Abdomen moderately large and heavy, about 1.5 times as broad as prothorax across coxae; dorsal surface without sculpture; most major setae, excepting the terminal and wing-retaining ones, distinctly dilated apically, the lateral seta on VII about 70 microns long, IX with setae I and II slightly dilated apically and 85-87 microns long, III pointed, 113 microns; terminal setae pointed and about 80 microns long; tube (segment X, only) about 0.7 the length of head, about 1.8 times as long as greatest subbasal width, the latter about 2.2 times the apical width, its sides straight.

Measurements of female (holotype), in mm.: Length about 1.05 (somewhat contracted); head, total length 0.186, width across eyes 0.126, least width just behind eyes 0.114, greatest width across cheeks 0.151, least width near base 0.140, width across basal collar 0.144; prothorax, median length of pronotum 0.117, width (inclusive of coxae) 0.248; mesothorax, width across anterior angles 0.230; abdomen, greatest width (at segment III) 0.370; tube (segment X, only), length 0.131, greatest subbasal width 0.072, least apical width 0.033.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	39	51	59	51	56	52	43	44
Width (microns):	37	33	31	29	27	25	22	13
Total length of antenna, 0.395 mm.								

Male (brachypterous). — Nearly identical in coloration and structure with female, though smaller and more slender; tarsal tooth scarcely stronger; sternum VIII of abdomen with the glandular area in the form of a very narrow subbasal line.

Measurements of male (allotype), in mm.: Length about 0.9; head total length 0.162, width across eyes 0.114, least width just behind eyes 0.104, greatest width across

cheeks 0.135, least width near base 0.126, width across basal collar 0.128; postocular setae, length 0.043, interval 0.088; mouth-cone, length beyond posterior dorsal margin of head 0.086; prothorax, median length of pronotum 0.114, width (inclusive of coxae) 0.216 mm.; antero-angular setae, length 0.049, midlaterals 0.048, epimerals 0.054, postero-marginals 0.058, coxals 0.042; mesothorax, width across anterior angles 0.220; abdomen, greatest width (at segment III) 0.314; tube, length 0.107, greatest subbasal width 0.063, least apical width 0.031; seta I on segment IX, length 0.084, II 0.053, III 0.103.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	46	55	50	54	50	39	39
Width (microns):	34	31	28	27	25	24	20	13
Total length of antenna, 0.370 mm.								

FLORIDA: Trenton, May 8, 1934, Dr. A. N. Tissot, 3 ♀♀ and 2 ♂♂ (including holotype and allotype), from fallen pine needles, etc.; and 1 ♀, without data, but presumably from Florida.

This species has heretofore not been differentiated from *batesi*, in fact, my material consists wholly of paratypes of that species. In *batesi*, however, the abdomen is brown, instead of bright yellow, and the glandular arrangement on the eighth abdominal segment of the male is wholly different. The present species is named in honor of Professor J. R. Watson, who has generously forwarded for study the holotypes of *batesi* and *reticulatus*, and given me a series of paratypes of these and other species of the genus.<sup>2</sup>

## 28. *Eurythrips silvarum*, sp. nov.

Female (apterous). — Length about 1.4 mm. (fully distended, 1.7 mm.). Color of thorax and abdomen of fully-matured individuals chestnut brown, resulting from dense red pigmentation underlying a dark brown integument, the tube

<sup>2</sup> In view of the fact that the type series of *batesi* is a mixed one, it may be well to identify the holotype of that species in an unmistakable manner. With a diamond-pointed pencil I have cut the words, "HOLOTYPE (upper specimen)" on the slide itself. The right-hand label reads, "Dead leaves | N. facing slope | Devil's Mill Hopper | Alachua Co., Fla. | 12-24-33 | J. R. W. — B. F." |. The left-hand label reads, "*Eurythrips* | *batesi* | (Watson) | Type ♀ | (upper) | JRW" |. This latter label has been affixed over an earlier one which reads "*Glyptothrips* | *bat-si* n. sp. | Paratype ♀ | Type ♀ | upper. | JRW" |, and on which the female sign after the word *paratype*, as well as the next two lines, is in pencil.

without such pigmentation and yellow in basal fifth; head paler, brownish yellow, shaded with dark blackish brown at sides, with red pigmentation laterally and in the ocellar region; legs golden yellow, with the femora (especially the fore pair) lightly shaded with brown laterally; antennae yellowish brown in about the first five segments and dark gray brown apically, the narrow pedicels of segments III-VI pale yellow, I-V darkened laterally with brown, II somewhat darker than I and about concolorous with V.

Head relatively short, its length scarcely 1.2 times the greatest width across cheeks and about 1.3 times the width across eyes, its form, conspicuous polygonal sculpture, and chaetotaxy almost identical with that of its closest relatives (see Hood, *Psyche*, 43 (1): 5, Fig. 2), except that the cheeks are much more swollen; postocular setae slightly dilated (or at least rounded) at tip, curving inward, about 22 microns long, 119 apart, and 21 from nearest facet of eyes; occipital setae much slenderer and shorter, pointed, about 14 microns long, 48 apart, and 68 from base of head; vertex and occiput elevated, the former with the postocellar setae pointed, equal to occipitals, and 43 microns apart. Eyes rounded, strongly protruding, coarsely faceted, about one-fourth the length of head, measuring 42 microns in dorsal length, 30 in width, their interval 71. Ocelli vestigial or wanting. Antennae almost identical with those of its closest allies; segments II-V with at least some of their major setae blunt, II-V distinctly reticulate; sense-cones slender and pointed, disposed as follows on the inner (and outer) surfaces of the segments: III 0 ( $0^{+1}$ ), IV 1 (1), V 1 (1), VI 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cones short and broadly rounded, extending about 53 microns beyond posterior dorsal margin of head when the latter is strictly horizontal.

Prothorax along median line of pronotum 0.64-0.66 the length of head and contained in the trans-coxal width about twice; dorsal surface reticulate anteriorly, transversely striate between and behind the postero-marginal setae; epimeron largely fused with pronotum; major setae nearly colorless, the antero-marginals minute and pointed, the others rounded at tip and tapering only slightly, 16-29 microns long, the coxals vestigial. Pterothorax about equal in width to prothorax, without ventro-lateral knobbed setae. Legs dis-

tinctly reticulate, fore tarsi with a short tooth at apex of first segment. Wings wanting.

Abdomen moderately large and heavy, about 1.5 times as broad as prothorax across coxae; dorsal surface largely lightly reticulate; most major setae, excepting the terminal and wing-retaining ones, similar to postoculars and prothoracics (i. e., moderately stout, rounded at tip, and tapering only slightly), the lateral seta on VII about 40 microns; IX with setae I and II blunt and 86-88 microns long, III pointed, 74 microns; terminal setae pointed and about 66 microns long; tube (segment X, only) about three-fourths the length of head, about twice as long as greatest subbasal width, the latter about 2.4 times the apical width, broadest at basal fourth (rather than across basal collar), its sides very slightly concave in apical three-fourths.

Measurements of female (topotypic paratype, caustic treated), in mm.: Length about 1.4 (fully distended, 1.71); head, total length 0.172, width across eyes 0.132, least width just behind eyes 0.116, greatest width across cheeks 0.148, least width near base 0.128; prothorax, median length of pronotum 0.110, width (inclusive of coxae) 0.238; mesothorax, width across anterior angles 0.241; abdomen, greatest width (at segment III) 0.368; tube (segment X, only), length 0.131, greatest subbasal width 0.063, least apical width 0.026.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	44	50	55	51	51	47	37	34
Width (microns):	10	33	27	30	29	21	21	13
Total length of antenna, 0.369 mm.								

Male (apterous). — Nearly identical in coloration and structure with female, though smaller and more slender; tarsal tooth scarcely stronger; sternum VIII of abdomen with the glandular area in the form of a narrow subbasal line about 6 microns wide.

Measurements of male (topotypic paratype, caustic treated), in mm.: Length about 1.3 (fully distended, 1.45); head, total length 0.156, width across eyes 0.115, least width just behind eyes 0.102, greatest width across cheeks 0.131, least width near base 0.111; postocular setae, length 0.021, interval 0.106; mouth-cone, length beyond posterior dorsal margin of head 0.056; prothorax, median length of pronotum 0.103, width (inclusive of coxae) 0.213; antero-angular setae, length 0.009 mm., midlaterals 0.017, epimerals 0.030, postero-



marginals 0.019; mesothorax, width across anterior angles 0.214; abdomen, greatest width (at segment III) 0.274; tube, length 0.102, greatest subbasal width 0.053, least apical width 0.025; seta I on segment IX, length 0.040, III 0.080.

Antennal segments: 1 2 3 4 5 6 7 8

Length (microns): 38 46 47 45 47 43 34 30

Width (microns): 36 28 24 27 25 23 19 12

Total length of antenna, 0.330 mm.

NEW YORK: Enfield Glen State Park, Tompkins Co., September 5 and 15, 1940, Dr. F. Reese Nevin, and Sep. 22, 1940, Dr. Nevin and J. D. H.; 46 ♀♀ and 19 ♂♂ (holotype and allotype taken Sep. 15). Warrensburg, October 12, 1940, William F. Royce, 1 ♀ and 2 ♂♂. All material was found among fallen pine needles.

Readily known from *reticulatus* by the shorter and broader head, and the more swollen cheeks, and from *claviger* by the absence of knobbed pterothoracic setae.

## 29. *Eurythrips claviger*, sp. nov.

Female (brachypterous). — Length about 1.6 mm. (fully distended, 1.93 mm.). Color of thorax and abdomen a rich chestnut brown, resulting from dense red pigmentation underlying a dark brown integument, the tube without such pigmentation but paler basally and apically; head paler, brownish yellow, shaded with brown at sides, with red pigmentation ventrally along sides and, to some extent, dorsally along median line; legs golden yellow, with the femora, and sometimes also the tibiae, shaded with brown, especially laterally; antennae nearly uniform grayish brown, with the narrow pedicel of segment III pale yellow.

Head long, its length about 1.3 times the greatest width across cheeks and 1.4 times the width across eyes, its form, conspicuous sculpture, and chaetotaxy almost identical with that of its closest allies (see Hood, *Psyche*, 43 (1): 5, Fig. 2), except that the cheeks are more swollen; postocular setae expanded and curved at tip, about 25 microns long, 113 apart, and 16 from nearest facet of eyes; occipital setae slenderer, but otherwise very similar, about 16 microns long, 52 apart, and about 60 from base of head; vertex and occiput elevated, the former with a pair of strong, dilated, curved, postocellar setae which are about 17-21 microns long, and

also with a slender, pointed pair of setae near the usual vertical pores. Eyes rounded, strongly protruding, coarsely faceted, about one-fourth the length of head, measuring 55 microns in dorsal length, 32 in width, their interval 76. Ocelli subequal, about 16 microns in diameter, the median one with its center about on a line with anterior margin of eyes, the posterior ones directed somewhat laterally, as well as upward, and about 37 microns apart. Antennae almost identical with those of its closest allies; segments II-V with at least some of their major setae either capitate or blunt, II distinctly reticulate; sense-cones slender and pointed, disposed as follows on the inner (and outer) surface of the segments: III 1 (2), IV 2 (2), V 1 ( $1^{+1}$ ), VI 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cone short and broadly rounded, extending about 60 microns beyond posterior dorsal margin of head.

Prothorax along median line of pronotum not quite 0.7 the length of head, contained in the transcoxal width about twice, with a short, vestigial, median apodeme at middle; most of dorsal surface very faintly sculptured; epimeron largely fused with pronotum; major setae all present, brownish yellow in color and dilated apically, the antero-marginals minute (about 15 microns), antero-angulars 43, midlaterals 44, epunerals 48, postero-marginals 31, coxals 29. Pterothorax slightly broader than prothorax, with two pairs of ventro-lateral knobbed setae, one of them just behind the rounded shoulders of mesothorax, the other close to the posterior end of metasternum. Legs distinctly reticulate, fore tarsi with a short curved tooth. Wings short, about 75 microns long.

Abdomen moderately large and heavy, about 1.4 times as broad as prothorax across coxae; dorsal surface largely lightly reticulate, the lateral reticles asperate; most major setae, excepting the terminal and wing-retaining ones, similar to postoculars and prothoracics, i. e., moderately stout, expanded, divided, and obliquely truncate apically, this giving them a somewhat golf-club-like form when seen from the proper direction, the lateral seta on VII about 64 microns, the three pairs on IX 89-96 microns long and straight, the terminal setae pointed and about 68 microns long; tube (segment X, only) about three-fourths the length of head, about 2.2 times as long as greatest subbasal width, the latter about twice the apical width, its sides very slightly concave.

Measurements of female (holotype), in mm.: Length about 1.57 (fully distended, 1.80); head, total length 0.192, width across eyes 0.136, least width just behind eyes 0.121, greatest width across checks 0.149, least width near base 0.132, width across basal collar 0.136; prothorax, median length of pronotum 0.132, width (inclusive of coxae) 0.262; pterothorax, width across anterior angles 0.269, greatest width 0.272; abdomen, greatest width (at segment III) 0.371; tube (X, only), length 0.147, greatest subbasal width 0.068, least apical width 0.033.

Antennal segments: <sup>3</sup>	1	2	3	4	5	6	7	8
Length (microns):	46	43	73	69	70	61	47	46
Width (microns):	35	32	27	25	23	20	18	14
Total length of antenna, 0.455 mm.								

Male (brachypterous). - Nearly identical in coloration and structure with female, though smaller and more slender; tarsal tooth somewhat stronger; sternum VIII of abdomen almost wholly occupied by the usual glandular area.

Measurements of male (allotype), in mm.:<sup>3</sup> Length about 1.29 (fully distended, 1.48); head, total length 0.173, width across eyes 0.126, least width just behind eyes 0.112, greatest width across checks 0.136, least width near base 0.120, width across basal collar 0.126; eyes, dorsal length 0.047, dorsal width 0.032, dorsal interval 0.062; postocular setae, length 0.027, interval 0.102, distance from eyes 0.017; postocellar setae, length 0.016, interval 0.039; mouth-cone, length beyond posterior dorsal margin of head 0.062; prothorax, median length of pronotum 0.138, greatest width (inclusive of coxae) 0.234; antero-marginal setae, length 0.007, antero-angulars 0.037, midlaterals 0.042, epimerals 0.043, postero-marginals 0.034, coxals 0.020; pterothorax, width across anterior angles 0.236; abdomen, greatest width (at segment III) 0.273; tube (segment X, only), length 0.113, greatest subbasal width 0.057, least apical width 0.028; seta I on segment IX 0.070, II 0.083; terminal setae 0.062.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	40	37	66	59	66	54	41	39
Width (microns):	30	29	26	25	23	20	17	12
Total length of antenna, 0.402 mm.								

<sup>3</sup>) Measured by Sarah Evelyn Claassen.

NEW YORK: Oswegatchie, August 18 to September 2, 1940, J. D. H., 6 ♀♀ and 15 ♂♂, from dead grass and debris (holotype and allotype taken August 26).

Readily known from the other reticulated species of the genus by the clavate pterothoracic setae.

30. *Malacothrips roycei*, sp. nov.

Female (brachypterous). — Length about 1.6 mm. (partially distended, 2.2 mm.). Color brown, the head and first five or six abdominal segments paler (sometimes nearly or quite yellow), the tube bright orange or yellow in basal half and abruptly dark gray-brown in apical half; internal pigmentation dark red, very dense in the thorax, in the head usually confined to the sides; legs sometimes clear yellow, but usually with the femora and tibiae shaded with brown, especially externally; antennae with segments I-III bright yellow and V-VIII blackish brown or even black, IV rarely yellow, usually brown, occasionally concolorous with V-VIII, II usually slightly darkened with brown laterally; major setae gray or yellowish, the terminal ones brown.

Head 1.2-1.3 times as long as greatest width, which is at or in front of middle of cheeks, the latter abruptly rounded to eyes and converging to base; head sharply constricted at posterior lateral margin of eyes, at this point narrowest; vertex slightly produced, scarcely overhanging, its surface distinctly subreticulate; extreme base and sides of head distinctly subreticulate; postocular setae dilated and divided at tip, 50-60 microns long, 120-124 apart, and arising about 18 from eyes; all other cephalic setae pale, pointed, and minute. Eyes rounded, prominent, strongly protruding, their dorsal length about 65 microns, width 49, interval 60. Posterior ocelli wanting, median ocellus situated at tip of vertex, about 10 microns in advance of anterior margin of eyes. Antennae normal in structure but more stout than usual; sense-cones slender, arranged as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2), V 1 ( $1^{+1}$ ), VI 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cone broadly rounded at tip, extending about 90 microns beyond posterior dorsal margin of head, when head is horizontal.

Prothorax along median line of pronotum 0.66-0.73 as long as head and (inclusive of coxae) about twice as wide

as long, without median thickening, its surface smooth except for a few faint striae along base and sides; epimeron not fused with pronotum; major setae all present, broadly dilated and distinctly divided at apex, antero-marginals 25-33 microns long, antero-angulars usually 34-36, midlaterals 44, epimerals 44-51, postero-marginals 50-57, coxals 36-42. Legs normal; fore tarsi not toothed.

Abdomen moderately broad and heavy, 1.2-1.3 times as wide as prothorax across coxae, dorsal surface almost smooth; major setae on segments II-VIII dilated and divided at apex; IX with the three pairs of major setae blunt at tip and respectively 110, 150, and 90 microns long, terminal ones 150-158 microns and equal in length to, or longer than, tube; tube (segment X. only) 0.67-0.7 as long as head and 1.8 times as long as greatest subbasal width (which is across basal collar), this about 2.1 times the apical width, sides perfectly straight in apical five-sixths.

Measurements of female (holotype), in mm.: Length about 1.62 (partially distended, 2.05); head, total length 0.197, width across eyes 0.156, least width just behind eyes 0.148, greatest width across cheeks 0.165, least width near base 0.153; prothorax, median length of pronotum 0.141, width (inclusive of coxae) 0.286; mesothorax, width across anterior angles 0.280; metathorax, greatest width 0.269; abdomen, greatest width (at segment IV) 0.374; tube (segment X, only), length 0.137, greatest subbasal width 0.080, least apical width 0.038.

Antennal segments:    1    2    3    4    5    6    7    8

Length (microns):    43   51   57   53   51   47   48   33

Width (microns):    43   35   34   33   31   27   25   14

Total length of antenna, 0.386 mm

Male (brachypterous). Coloration and general structure almost as in female, fore tarsi unarmed; sternum VIII with a very small, transversely elliptical, glandular area at middle, usually about 20 microns long and 30 microns wide.

Measurements of male (allotype), in mm.: Length about 1.3 (partially distended, 1.72); head, total length 0.187, width across eyes 0.145, least width just behind eyes 0.136, greatest width across cheeks 0.158, least width near base 0.146; postocular setae, length 0.051, interval 0.114, distance from eyes 0.017; mouth-cone, length beyond posterior dorsal margin of head 0.103; prothorax, median length of pronotum

tum 0.130, greatest width (inclusive of coxae) 0.286; antero-marginal setae, length 0.034, antero-angulars 0.034, midlaterals 0.036, epimerals 0.049, postero-marginals 0.050, coxals 0.038; pterothorax, width across anterior angles 0.255; abdomen, greatest width (at segment III) 0.309; tube (X, only), length 0.129, greatest subbasal width (distad of basal collar) 0.073, least apical width 0.038; seta I on segment IX 0.110, II 0.034, III 0.107; terminal setae 0.151.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	40	18	56	51	53	46	43	34
Width (microns):	10	35	34	34	32	28	26	16
Total length of antenna, 0.371 mm.								

NEW YORK: Warrensburg, October 12, 1940, William F. Royce, 3 ♀♀ and 3 ♂♂ (including holotype and allotype), on grass.

VIRGINIA: Natural Bridge, November 16, 1940, Dr. Lincoln C. Pettit, 26 ♀♀ and 17 ♂♂, on sedges.

This species is very distinct from the others of its genus, and differs notably in the bicolored tube, shorter head, stouter antennae, and the arrangement of the sense-cones. Largely in token of the days we have spent together on streams and lakes and in the woods of New York State, I have named this large and colorful species after Mr. William F. Royce, senior Assistant in Biology at Cornell University, who collected it and a number of other equally interesting forms.

### 31. *Diceratothrips delicatus*, sp. nov.

Female (macropterous). — Length about 2.4 mm. (fully distended, 2.9 mm.). Color distinctly paler than in other species of the genus, the integument yellowish brown, rather than nearly black, the almost opaque internal pigmentation yellow-orange by reflected light, rather than red, the head and last five or six abdominal segments blackish brown; legs brown, not blackish brown, with the tarsi and the apical third or so of all femora, yellow; wings clear, lightly washed with yellowish or light brownish at base and very narrowly edged with darker; antennae relatively pale, segment I and base of II yellowish brown, the remainder of II, and all of III excepting the narrowly darkened tip, bright yellow, IV-VIII brown, IV paler than the others and distinctly yellowish subbasally; major setae dark brown or blackish brown basally, colorless apically.

Head long, 1.4-1.5 times as long as greatest width, which is at anterior third of cheeks, the latter gently rounded to eyes and roundly tapering to basal collar, with three or four short, inconspicuous, dark, pointed setae; vertex not produced and not overhanging, sloping evenly downward; dorsal and lateral surfaces lightly transversely striate in the area posterior to eyes, nearly smooth medially; postocular setae slender, blunt at tip, 86-103 microns long, 123-130 apart, and usually about 18 from eyes; frontal setae minute (about 14 microns), pale, and inclined mediad, rather than directed forward. Eyes typical, about 0.23 the length of head, measuring as follows, in microns, in one caustic-treated paratype: dorsal length 78, dorsal width 63, dorsal interval 90, ventral length 51, ventral width 55, ventral interval 106, their posterior lateral angles with several enlarged facets. Ocelli 16-17 microns in diameter, the posterior ones 49 microns apart and about 30 from median ocellus. Antennae normal in structure, segment VIII narrowed just beyond the slightly flared base, IV-VI slightly produced ventrally at apex; sense-cones short, pointed, III and IV each with one on ventral surface, that on IV at the apex of the slight prolongation, III with an additional one on outer surface, IV with an additional one on both outer and inner surfaces, V with one on either surface and a vestigial one on outer surface, VI with one on either surface, but the outer one vestigial, VII with the usual one on dorsum. Mouth cone normal, rounded at tip, extending about 181 microns beyond posterior dorsal margin of head; second segment of maxillary palpi about 51 microns long.

Prothorax across coxae 2.4-2.5 times the median length of pronotum, the latter somewhat less than one-half as long as head, without median apodeme, its form normal, its surface subreticulate anteriorly and laterally, and finely and closely transversely striate posteriorly; epimeron usually partially fused with pronotum; epimeral and postero-marginal setae blunt and respectively 72 and 53 microns long (in one paratype), coxals 25-33, the other setae minute (17-25 microns). Legs normal, the fore pair moderately stout, fore tarsi with a slightly curved tooth which is about 25 microns long. Wings normal, in holotype 1.04 mm. long and 126 microns wide subapically, where they are broadest, with 23 accessory setae in holotype, subbasal setae nearly colorless, blunt at tip, and 30, 48, and 136 microns long, respectively.

**Abdomen** broadest at segment V, where it is about 1.2 times the trans-coxal width of prothorax; setae stout basally and slender apically, most of them pointed, the three pairs on IX 274-280 microns long, terminal ones about 154 microns; tube (segment X, only) heavily sclerotized, about three-fourths the length of head, broadest across basal collar and strongly constricted at apex, the intermediate portion nearly straight and slightly tapering, in holotype 2.37 times as long as greatest width, its apical width 0.44 as great.

**Measurements of female (holotype), in mm.:** Length about 2.35 (fully distended, 2.93); head total length 0.350, width across eyes 0.220, greatest width across cheeks 0.237, least width in front of basal collar 0.202, width across collar 0.207, least width at base 0.193; prothorax, median length of pronotum 0.172, width (inclusive of coxae) 0.410; pterothorax, width across anterior angles 0.385, greatest width 0.406; abdomen, greatest width (at segment V) 0.489; tube (segment X, only), length 0.265, greatest subbasal width 0.112, least apical width 0.049.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	58	77	130	98	80	66	63	48
Width (microns):	48	37	34	36	36	32	30	16
Total length of antenna, 0.620 mm								

**Male (macropterous).** -- Color and general structure as in female; anterior angles of prothorax not at all produced; fore legs longer and stronger than in female, their femora with a group of stout, pointed, brown setae on inner surface near middle, their tarsi with a long tooth (40-62 microns).

**Measurements of male (paratype, caustic-treated), in mm.:** Length about 1.96 (fully distended, 2.35); head, total length 0.316, width across eyes 0.200, greatest width across cheeks 0.207, least width in front of basal collar 0.169, width across collar 0.176, least width at base 0.171; eyes, dorsal length 0.077, dorsal width 0.057, dorsal interval 0.085, ventral length 0.048, ventral width 0.050, ventral interval 0.100; median ocellus, diameter 0.019; posterior ocelli, diameter 0.016, interval 0.049, distance from median ocellus 0.025; postocular setae, length 0.083, interval 0.113, distance from eyes 0.015; mouth-cone, length beyond posterior dorsal margin of head 0.168; prothorax, median length of pronotum 0.182, greatest width (inclusive of coxae) 0.378; antero-marginal setae, length 0.016, antero-angulars 0.017, midlaterals 0.018, epimerals 0.071,



postero-marginals 0.042, coxals 0.022; pterothorax, width across anterior angles 0.343, greatest width 0.344; fore wings, length 0.889, greatest subapical width 0.102, lengths of subbasal setae 0.030, 0.047, and 0.107, respectively; abdomen, greatest width (at segment V) 0.409; tube (segment X, only), length 0.272, greatest subbasal width 0.089, least apical width 0.043; seta I on segment IX 0.225, II 0.238, III 0.249; terminal setae, 0.156.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	54	74	125	95	78	61	62	47
Width (microns):	46	35	33	34	31	29	27	15
Total length of antenna, 0.596 mm.								

FLORIDA: Key West, July 23, 1940, Professor J. Chester Bradley, 5 ♀♀ and 5 ♂♂, from dead branches.

Thoroughly distinctive in coloration and smaller in size than any other species of the genus, this interesting form agrees with *armatus*, *robustus*, and *picticornis* in having the fore femora of the male armed on the inner surface with a group of stout setae which, being typical heterogonic structures, will be found to vary in size and number directly as the size of the individual.

### 32. *Diceratothrips obscuricornis*, sp. nov.

Female (macropterous). — Length about 3.1 mm. (fully distended, 3.8 mm.). Color dark blackish brown, wholly black in head, tube, and segments VIII and IX of abdomen, the internal pigmentation opaque by transmitted light, yellow-orange by reflected light; legs blackish brown, with the fore tarsi and all knees and trochanters distinctly yellowish; wings clear, lightly washed with yellowish or light brownish at base and very narrowly edged with darker; antennae nearly black in segments I and V-VIII, segment II yellow at apex and in middle of apical half, III largely golden yellow, shaded with dark gray across middle, along inner surface, and across tip, IV nearly black but with a yellowish brown cloud on outer surface beyond middle; major setae dark yellowish brown, or brown, basally and colorless apically, those on distal abdominal segments darkest, the terminal ones nearly black.

Head nearly 1.5 times as long as greatest width, which is at middle of cheeks, the latter subparallel, rounded to eyes and to basal collar, with five short, inconspicuous, dark brown, pointed setae projecting beyond their lateral outline; vertex not produced and not overhanging, sloping evenly downward;

dorsal and lateral surfaces with distinct, dark, anastomosing striae at sides and across base; postocular setae slender, blunt at tip, 80 microns long, 161 apart, and about 23 from eyes; frontal setae minute (about 30 microns), pale, and inclined mediad, rather than directed forward. Eyes typical, about 0.27 the length of head, their dorsal length approximately 105 microns, their posterior lateral angles with several enlarged facets. Median ocellus about 25 microns in diameter, the posterior ones smaller (possibly 20 microns in diameter), about 66 microns apart and 43 from median ocellus. Antennae normal, segment VIII conical, closely united with VII, and longer ventrally, IV-VI slightly produced ventrally at apex; sense-cones short, pointed, III and IV each with one on ventral surface, that on IV at the apex of the slight prolongation, III with an additional one on outer surface, IV with one on inner surface and two on outer, V with one on either surface and a vestigial one on outer surface, VI with one on either surface, but the outer one vestigial, VII with the usual one on dorsum. Mouth-cone normal, rounded at tip, extending about 224 microns beyond posterior dorsal margin of head; second segment of maxillary palpi about 40 microns long.

Prothorax across coxae about 2.27 times the median length of pronotum, the latter nearly 0.6 as long as head, without median apodeme, its anterior margin slightly thickened and somewhat less concave than usual, its surface subreticulate anteriorly and laterally, and transversely striate posteriorly; epimeron slightly fused with pronotum; major setae blunt, the epimerals and postero-marginals respectively 120 and 149 microns long, coxals 41, the other setae small. Legs normal, the fore pair moderately stout, fore tarsi with a slightly curved tooth which is about 45 microns long. Wings normal, in holotype 1.32 mm. long and 146 microns wide subapically, where they are broadest, with 28-31 accessory setae in holotype, subbasal setae nearly colorless, blunt at tip, and 55, 98, and 179 microns long, respectively.

Abdomen broadest at segment V, where it is about 1.23 times the trans-coxal width of prothorax; setae slender apically, most of them pointed, the three pairs on segment IX 329-357 microns long, the terminal ones about 196 microns; tube (segment X, only) 1.1 times the length of head, broadest across basal collar and strongly constricted at apex, the inter-

mediate portion nearly straight and only slightly tapering, nearly 3.4 times the greatest width, its apical with about 0.45 the subbasal.

Measurements of female (holotype), in mm.: Length about 3.11 (fully distended, 3.80); head, total length 0.386, width across eyes 0.259, greatest width across cheeks 0.263, least width in front of basal collar 0.234, width across collar 0.246, least width at base 0.234; prothorax, median length of pronotum 0.223, width (inclusive of coxae) 0.505; pterothorax, width across anterior angles 0.489, greatest width 0.518; abdomen, greatest width (at segment IV) 0.619; tube (segment X, only), length 0.420, greatest subbasal width 0.124, least apical width 0.056.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	60 <sup>4</sup>	95	148	127	104	80	76	51 <sup>5</sup>
Width (microns):	57	46	42	44	41	35	32	21
Total length of antenna, 0.741 mm.								

CUBA: El Retiro, Pinar del Rio (foot of Sierra Rangel), March 25, 1939, Professor J. Chester Bradley, 1 ♀, from dead branches.

The antennal coloration is unique in the genus, and the tube is unusually long.

### 33. *Diceratothrips setigenis*, sp. nov.

Female (macropterous). Length about 3.0 mm. (fully distended, 3.8 mm.). Color dark blackish brown, wholly black in head, tube, and segments VII-IX of abdomen, the internal pigmentation opaque by transmitted light, yellow-orange by reflected light; legs blackish brown, with the knees and trochanters paler but not yellow, all tarsi brown, fore tarsal tooth yellow; wings clear, lightly washed with yellowish or light brownish at base and very narrowly edged with darker; antennae nearly black in segments I and IV-VIII, segment II yellow at apex and in middle of apical half, III pale yellow, abruptly nearly black in apical eighth; major setae nearly black, those of head and thorax with pale tips, those on apical abdominal segments colorless apically, the terminal ones nearly black.

<sup>4</sup>) Dorsal exposed length.

<sup>5</sup>) Maximum ventral length.

Head 1.4 times as long as greatest width, which is at middle of cheeks, the latter subparallel, rounded to eyes and to basal collar, with about five dark brown setae projecting beyond their lateral outline, the largest of these about 44 microns in length and 4 microns in diameter, all of them with pale pointed tips; vertex somewhat produced and overhanging, its anterior surface nearly vertical; dorsal and lateral surfaces distinctly striate in about basal third; postocular setae slender, rounded at tip, 147 microns long, 168 apart, and about 26 from eyes; frontal setae dark, stout, about 35 microns long, and directed forward. Eyes typical, one-fourth the length of head, their posterior lateral angles with several enlarged facets, measuring as follows, in microns, in one caustic-treated paratype: dorsal length 109, dorsal width 80, dorsal interval 127, ventral length 73, ventral width 77, ventral interval 134. Ocelli 26-28 microns in diameter, the posterior ones about 81 apart and 43 from median ocellus. Antennae normal, segment VIII conical, closely united with VII, IV-VI slightly produced ventrally at apex; sense-cones short, pointed, III and IV each with one on ventral surface, that on IV at the apex of the slight prolongation, III with an additional one on outer surface, IV with one on inner surface and two on outer, V with one on either surface and a vestigial one on outer surface, VI with one on either surface but the outer one vestigial, VII with the usual one on dorsum. Mouth-cone narrower than usual, with sides concave, its tip extending about 272 microns beyond posterior dorsal margin of head; second segment of maxillary palpi about 87 microns long.

Prothorax across coxae about 2.4 times the median length of pronotum, the latter one-half as long as head, with slight median apodeme in front of middle, its anterior margin scarcely thickened and concave as usual, its surface rather strongly subreticulate anteriorly and laterally, and transversely striate posteriorly, smooth in a small area at middle; epimeron sometimes partially fused with pronotum; major setae with pale blunt tips, the two pairs on anterior margin small (25-40 microns long), midlaterals about 77, epimerals and postero-marginals respectively 110 and 94, coxals 64. Legs normal, the fore pair moderately stout, fore tarsi with a slightly curved tooth which is about 75 microns long. Wings normal, about 1.43 mm. long and 162 microns wide subapically, where they are broadest, with about 33 accessory setae, the subbasal

setae colorless, blunt at tip, and 41, 53, and 140 microns long, respectively.

Abdomen broadest at segment V, where it is about 1.17 times the trans-coxal width of prothorax; setae slender apically, most of them pointed, the three pairs on segment IX 347-372 microns long, the terminal ones about 210 microns; tube (segment X, only) scarcely 1.1 times the length of head, broadest across basal collar and abruptly narrowed, rather than constricted, at apex, the intermediate portion straight and evenly tapering, nearly 3.25 times the greatest width, its apical width about 0.43 the subbasal.

Measurements of female (paratype, caustic-treated), in mm.: Length about 3.04 (fully distended, 3.78); head, total length 0.432 width across eyes 0.287, least width just behind eyes 0.284, greatest width across cheeks 0.307, least width in front of basal collar 0.279, width across collar 0.288, least width at base 0.262; prothorax, median length of pronotum 0.224, width (inclusive of coxae) 0.540; pterothorax, width across anterior angles 0.557, greatest width 0.580; abdomen, greatest width (at segment V) 0.630; tube (segment X, only), length 0.456, greatest subbasal width 0.140, least apical width 0.060.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	87	92	198	136	113	90	80	38
Width (microns):	57	41	44	42	39	35	33	21
Total length of antenna, 0.834 mm.								

TEXAS: Brownsville, March 2, 1939, J. D. H., 4 ♀♀, from dead branches.

When first taken, this species was thought to be *harti*; but in that species the cheeks have two pairs of strong setae, only, projecting beyond their lateral margins, and the head of the female is 1.5-1.6 times as long as its greatest width

#### 34. *Diceratothrips cubensis*, sp. nov.

Female (macropterous). — Length about 3.7 mm. (fully distended, 4.6 mm.). Color black, the tube uniform in color, the legs somewhat paler at articulations, fore tarsal tooth yellow, antennae with extreme apex of segment II, and extreme base of III, yellow; internal pigmentation red or yellow orange; wings clear, dark brown in scale and very narrowly edged with darker, the fore pair with an indistinct postmedian line

which disappears beyond middle; major setae black basally and colorless apically.

Head 1.4 times as long as greatest width, which is at middle of cheeks, the latter subparallel, gently rounded to eyes and to basal collar, with four or five short, nearly black setae projecting beyond their lateral outline, the largest of these about 33 microns in length and 4 microns in diameter, all of them with pale rounded tips; vertex somewhat produced and slightly overhanging, its anterior surface nearly vertical; dorsal and lateral surfaces with fine, distinct, anastomosing striae which are less distinct medially; postocular setae strong (about 7 microns in diameter), rounded at tip, 163 microns long, 152 apart, and about 23 from eyes; frontal setae relatively small, dark, about 34 microns long and directed forward. Eyes typical, about 0.26 the length of head, their posterior lateral angles with several enlarged facets, measuring as follows, in microns, in the caustic-treated paratype: dorsal length 113, dorsal width 85, dorsal interval 130, ventral length 85, ventral width 82, ventral interval 137. Ocelli 33-34 microns in diameter, the posterior ones about 75 microns apart and 36 from median ocellus. Antennae normal, segment VIII conical, closely united with VII, and longer ventrally, IV-VI very slightly produced ventrally at apex; sense-cones short, pointed, III and IV each with one on ventral surface, that on IV at the apex of the slight prolongation, III with an additional one on outer surface, IV with one on inner surface and two on outer, V with one on either surface and a vestigial one on outer surface, VI with one on either surface, but the outer one vestigial, VII with the usual one on dorsum. Mouth-cone normal, rounded at tip, extending about 343 microns beyond posterior dorsal margin of head; second segment of maxillary palpi about 87 microns long.

Prothorax across coxae about 2.26 times the median length of pronotum, the latter about 0.62 as long as head, with traces of median apodeme, its anterior margin scarcely thickened and concave as usual, its surface subreticulate anteriorly and laterally, and transverse striate posteriorly; epimeron slightly fused with pronotum; major setae nearly pointed, the antero-marginals about 41 microns long, antero-angulars 63, midlaterals 84, epimerals and postero-marginals respectively 207 and 197. Legs normal, the fore pair moderately stout, fore tarsi with a slightly curved tooth which is possibly 70

microns long. Wings normal, in holotype 1.46 mm. long and possibly 163 microns wide subapically, where they are broadest, with about 36 accessory setae, the subbasal setae colorless, blunt at tip, and 57, 95, and 164 microns long, respectively.

Abdomen broadest at segment IV, where it is about 1.2 times the trans-coxal width of prothorax; setae slender apically, most of them pointed, the three pairs on segment IX 504-546 microns long, the terminal ones about 277 microns; tube (segment X, only) 1.2-1.3 times the length of head, broadest across basal collar and abruptly narrowed, rather than constricted, at apex, the intermediate portion straight and evenly tapering, four times the greatest width, its apical width about one-half the subbasal.

Measurements of female (paratype, caustic-treated), in mm.: Length about 3.7 (fully distended, 4.59); head, total length 0.431, width across eyes 0.300, greatest width across cheeks 0.312, least width in front of basal collar 0.288, width across collar 0.300, least width at base 0.287; prothorax, median length of pronotum 0.266, width (inclusive of coxae) 0.602; pterothorax, width across anterior angles 0.616, greatest width 0.654; abdomen, greatest width (at segment IV) 0.717; tube (segment X, only), length 0.554, greatest subbasal width 0.139, least apical width 0.071.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	84	103	193	152	120	92	87	65 <sup>6</sup>
Width (microns):	60	46	47	47	43	39	32	20
Total length of antenna,	0.896 mm.							

CUBA: San Miguel de los Baños, Matanzas, July 18, 1940, Professor J. Chester Bradley, 2 ♀♀, from dead branches.

Allied to the Mexican *inferorum*, but with the wings nearly colorless and narrower, and the antennal segments, frontal setae, and genal setae shorter.

### 35. *Gastrothrips intonsus* sp. nov.

Female (brachypterous). — Length about 2.1 mm. (nearly fully distended, 2.6 mm.). Color nearly black, complete-

<sup>6</sup>) Maximum ventral length.

ly and opaquely so in abdominal segments VI-IX, the head blackish brown but paler at sides behind eyes; internal pigmentation red, lacking from head, antennae, legs, and tube; all coxae brown or blackish brown, all trochanters bright lemon-yellow; femora brown, with pale yellow tips, the middle and hind pairs also pale ventrally; fore tibiae yellow at base and along inner and outer surfaces, the remainder dark brown; middle and hind tibiae blackish brown; tarsi yellow, the middle and hind pairs (especially the latter) shaded with brown; antennae with segments I and II, and outer half and extreme base of III, pale whitish yellow, the intervening portion of III dark brown, IV-VIII nearly black.

Head unusually wide, about as broad as long, distinctly wider across cheeks than across eyes, the former slightly convex and strongly converging posteriorly, where the least width of the head is about 0.8 that across cheeks; vertex flat, neither produced nor overhanging; surface of head smooth and shining, the few and very faint anastomosing lines confined to sides and base and producing only a slight serration of the cheeks; postocular setae about 76 microns long, 190 microns apart, and only 10 microns from posterior margin of eyes, brown in color, with pale, rounded tips; anterior two-thirds of cheeks with five pairs of conspicuous, strictly lateral setae, of which the longest are 23 microns in length and moderately stout. Eyes subrectangular in dorsal aspect, protruding anteriorly, moderately small, about 0.3 the length of head, less than half as wide as their interval, and with a few larger facets at outer posterior angle, the interval between eyes across front of head just equal to the axial distance from their posterior margin to base of head; dorsal length of eyes 71 microns, width 56 microns, least interval 130 microns. Ocelli small, 13-14 microns in diameter, the median one with its center about 27 microns behind anterior margin of eyes, the posterior pair about 87 microns apart. Antennae thoroughly typical of the genus in form and chaetotaxy; segment VII with the pedicel slender, VIII narrowed basally; segment III with two sense-cones, both of them ventral, one on inner, the other on outer, surface; IV with three sense-cones, of which two are on the inner, and one on the outer, surface; V 1 ( $1^{+1}$ ), VI 1 ( $0^{+1}$ ), VII 1 dorsal.

Prothorax across coxae about 2.27 times the median



length of pronotum, which is about 0.74 the length of head; pronotum with partial median apodeme and with the anterior margin heavily thickened and nearly straight, the posterior margin distinctly sculptured; epimeron fused with pronotum in posterior half; major setae all present, dark brown with pale, nearly pointed tips, the antero-marginals about 34 microns, antero-angulars 53, midlaterals 56, epimerals 105, postero-marginals 63, coxals 42. Wings dark brown, about attaining base of abdomen, 186 microns long. Fore femora stout; fore tarsi with a broad, heavy, obtuse tooth.

Abdomen large and broad, about 1.43 times the width of prothorax across coxae; anterior sterna longer than corresponding terga and with their anterior margins arched forward; abdominal setae pointed, most of them dark brown with pale tips, but the lateral pair on VI, VII, and VIII, and all on IX, yellow or yellowish; IX with the three major pairs about 165 microns long; tube (segment X, only) more than 0.9 the length of head and unusually stout, less than 1.7 as long as greatest subbasal width, somewhat expanded in basal third, thence evenly tapering to apical fourth, sharply constricted at extreme tip, where its width is less than one-third the greatest width, its dorsal surface in subbasal portion with about a dozen slightly elevated longitudinal ridges.

Measurements of female (holotype), in mm.: Length about 2.1 (partially distended, 2.6); head, total length 0.241, width across eyes 0.242, least width just behind eyes 0.238, greatest width across cheeks 0.248, least width near base 0.199, width across basal collar 0.206; prothorax, median length of pronotum 0.178, width (inclusive of coxae) 0.405; pterothorax, width across anterior angles 0.424, greatest width 0.424; abdomen, greatest width (at segment V) 0.580; tube (segment X, only), length 0.228, greatest subbasal width 0.139, least apical width 0.044; terminal setae, length 0.060. of pterothorax and abdomen.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	51	73	80	71	73	66	49	33
Width (microns):	47	42	39	41	41	37	28	13
Total length of antenna, 0.496 mm.								

PERU: San Domingo, Dept. of Huanuco (elevation ca. 3000 m.), November 27, 1937, Felix Woytkowski, 1 ♀, «dry branches with leaves.»

This species is very suggestive of, and doubtless closely related to, the Brazilian *G. picticornis*. The form of the body and head and antennae, and the coloration of the legs, is nearly identical in the two; and the coloration of the antennae, though very different in detail, is in agreement in the peculiar feature that the first segment of *picticornis*, and the first two of *intonsus*, are nearly colorless. Both, too, have strikingly heavy tubes; but in *picticornis* this structure is opaque coal black, with strongly tapering, straight sides, while in *intonsus* it is bright reddish orange, much less strongly tapering, and very sharply constricted at its tip. The specific name has reference to the be-whiskered cheeks — a unique character in the females of this genus.

36. *Adelothrips phaeura*, sp. nov.

Female (apterous). - Length about 1.7 mm. (fully distended, 2.17 mm.). Color uniform pale yellow, the tube orange-brown, distinguishably tipped with gray and paler basally and subapically, the ninth abdominal segment more or less shaded with brown at sides apically, the antennae concolorous with body in segments I-IV, the distal segments successively darker, V shaded with brown apically, VII dark brown, except basally; internal pigmentation bright red, consisting of small scattered patches in head, prothorax, and along sides of pterothorax and abdomen.

Head long, fully 1.4 times its greatest width, which is across middle of cheeks, the cheeks themselves nearly parallel and rounded to eyes, the median dorsal area of head somewhat arched and elevated; vertex flattened, not overhanging; dorsal and lateral surfaces of head smooth, with a few very faint lines of sculpture basally; postocular setae yellow, short (53 microns), pointed, about 151 microns apart and 21 microns from eyes; all other cephalic setae pale and pointed, those on sides of cheeks short, those on vertex and near median line extremely fine and 25-27 microns long. Eyes directed more forward than laterally, subquadrangular in dorsal aspect, about 0.21 the length of head, not protruding, but with a few enlarged facets at outer posterior margin, their length about 60 microns. Ocelli wanting. Antennae normal, stout, with the usual suture on ventral surface of segment VII; sense-cones long and slender, disposed as follows on the inner (and outer) surfaces of segments: III 1 (1), IV 2 ( $2^{+1}$ ), V 1 ( $1^{+1}$ ), VI 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cone large, heavy, broadly rounded at tip, not attaining posterior margin of prosternum, its extent beyond posterior dorsal mar-

gin of head about 168 microns; maxillary palpi moderately large and heavy, their second segment approximately 52 microns long.

Prothorax with median line of pronotum about 0.7 that of head and contained in the trans-coxal width 1.8 times, its surface without sculpture, midline without apodeme; all major setae present, the antero-marginals pointed and about 46 microns long, the others blunt at tip and measuring as follows in microns: antero-angulars 34, midlaterals 50, epimerals 53, postero-marginals 57, coxals 30. Pterothorax normal, width across anterior angles much less than that of prothorax inclusive of coxae, metathorax broader. Legs normal, moderately stout, the fore tarsi with a long (35 microns), strong tooth. Wings wanting.

Abdomen slightly broader than prothorax, with a few widely-spaced transverse striae in anterior portion of tergum I, the remaining terga smooth; setae yellow, the lateral series, those on IX, and the terminal ones pointed, the dorso-laterals blunt, the three major pairs on IX respectively 120, 160, and 150 microns long, the terminal ones 210 microns; tube (segment X, only) heavily sclerotized, nearly 0.7 as long as head, 1.86 times as long as greatest subbasal width (which is across the basal collar), this width about 2.35 times the least apical width, its sides slightly concave before middle, its tip strongly constricted.

Measurements of female (holotype), in mm.: Length about 1.72 (fully distended, 2.17); head, total length 0.284, width across eyes 0.175, greatest width across cheeks 0.200, width across basal collar 0.204; prothorax, median length of pronotum 0.203, width (inclusive of coxae) 0.370; pterothorax, width across anterior angles 0.302, greatest width 0.311; abdomen, greatest width (at segments III and IV) 0.374; tube (segment X, only), length 0.175, greatest subbasal width 0.094, least apical width 0.040.

Antennal segments:	1	2	3	4	5	6	7
Length (microns):	53	63	69	66	61	61	69
Width (microns):	48	40	40	41	39	38	31
Total length of antenna, 0.442 mm.							

FLORIDA: Palmdale, March 31, 1938, Professor J. Chester Bradley and J. F. Bradley, 2 ♀♀, from dead branches.

Though evidently very close to the genotype, which, too, was described from Florida, this species is clearly distinct and not merely the apterous form of *xanthopus*, because of the differently formed and much more heavily sclerotized tube, the much shorter and blunt (rather than dilated) setae, and the presence of only two sense-cones on the third antennal segment. The paratype has the pair of dorsal setae on the ninth abdominal segment only 56 microns long, as against 120 in the holotype, but is otherwise thoroughly typical.

37. *Adelothrips macrura*, sp. nov.

Female (macropterous). — Length about 2.8 mm. (fully distended, 3.5 mm.). Color uniform pale yellow, the tube brownish orange, distinguishably tipped with gray, the ninth abdominal segment more or less shaded with brown at sides apically, the antennae concolorous with body in segments I and II, the more distal segments successively darker, III shaded with brown apically, IV and V brown in apical half or more, VI brown in apical two-thirds, VII dark brown; fore wings pale gray, darker at middle (except for a pale median streak) and at base; internal pigmentation bright red, consisting of a large patch in head, two in prothorax along anterior and posterior margins (nearly connected laterally and medially), one along each side of mesothorax (these last prolonged posteriorly to middle of metathorax, connected ventrally along anterior margin of mesothorax and joined also to a large mesonotal and a smaller metanotal patch), the abdomen with a pair of lateral patches in segments II-IX.

Head long, nearly 1.5 times its greatest width (which is across eyes, the width across cheeks opposite posterior margin of eyes negligibly less), the cheeks curving slightly to eyes and roundly converging to basal collar, the latter tapering to base, the least width 0.85 the greatest anterior width; median dorsal area of head somewhat arched and elevated; vertex rounded, not overhanging; dorsal and lateral surfaces of head faintly subreticulate, except medially; postocular setae yellow, relatively short (70 microns), pointed, about 204 microns apart and 54 microns from eyes; all other cephalic setae pale and pointed, those on sides of cheeks short, those on vertex and near median line extremely fine, some as long as 26 microns. Eyes directed more forward than laterally, subquadrangular in dorsal aspect, about 0.37 the length of head and protruding at outer posterior angles because of the presence of three much-enlarged facets, their length about

94 microns. Ocelli moderately enlarged, 27-28 microns in diameter and situated close together, the posterior ones about 34 microns apart, the median one directed upward and forward, slightly overhanging, and with its front margin on a line with that of eyes. Antennae normal, though more slender than usual in the genus, with partial suture on ventral surface of segment VII, as usual; sense-cones long and slender, disposed as follows on the inner (and outer) surfaces of segments: III 1 (2), IV 2 ( $2^{+1}$ ), V 1 ( $1^{+1}$ ), VI 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cone large, heavy, broadly rounded at tip, not attaining posterior margin of prosternum, its extent beyond posterior dorsal margin of head about 171 microns; maxillary palpi moderately large and heavy, their second segment approximately 56 microns long.

Prothorax with median line of pronotum about 0.55 that of head and contained in the trans-coxal width 2.27 times, its surface without sculpture, midline with distinct, partial apodeme; all major setae present, pointed, measuring as follows in microns: antero-marginals 20, antero-angulars 37, midlaterals 26, epimerals 140, postero-marginals 130, coxals 90. Pterothorax normal, width across anterior angles less than that of prothorax, metathorax broader than mesothorax but narrower than prothorax. Legs normal, the fore tarsi with a long (35 microns), strong tooth. Wings present, the fore pair 1.29 mm long, broadest (130 microns) subapically, with 14-15 accessory setae and with the three subbasal setae disposed in a triangle and respectively 53, 90, and 181 microns long.

Abdomen broader than prothorax, with a few, widely-spaced, pale lines of sculpture; setae yellow, long and pointed, the three major pairs on IX respectively 336, 340, and 311 microns long (terminal ones broken in type); tube (segment X, only) heavily sclerotized, very long, 0.95 the length of head, 2.8 times as long as greatest subbasal width (which is across the basal collar), this width about 2.45 times the least apical width, its sides slightly concave before middle, its tip strongly constricted.

Measurements of female (holotype), in mm.: Length about 2.8 (fully distended, 3.54); head, total length 0.375, width across eyes 0.252, greatest width across cheeks 0.251, least width near base 0.214, width across basal collar 0.224; prothorax, median length of pronotum 0.207, width (inclusive

of coxae) 0.470; pterothorax, width across anterior angles 0.430, greatest width 0.449; abdomen, greatest width (at segment II) 0.494; tube (segment X, only), length 0.356, greatest subbasal width 0.125, least apical width 0.051.

Antennal segments:	1	2	3	4	5	6	7
Length (microns):	70	86	112	106	94	86	89
Width (microns):	63	43	48	49	45	40	30
Total length of antenna, 0.643 mm.							

CUBA: Mina Carlota (Trinidad Mts., 1300 feet). March 23, 1939, Professor J. Chester Bradley, 1 ♂, from dead branches.

This large species is remarkable for the long, slender, and heavily sclerotized tube, which is abruptly constricted at its apex.

### 38 (*Edaleothrips brunneus*, sp. nov.

Female (apterous). - Length about 2.6 mm. (fully distended 3.2 mm.). Color chestnut-brown in head, thorax, and abdominal segments II and III, the head fading to pale yellow between antennae, the abdomen fading to brownish yellow (testaceous) in the apical segments, IV-VIII each with a dark brown transverse band whose anterior margin is the black subbasal line, IX heavily darkened at sides, the tube (X) nearly black at tip and along sides and lightly flecked with brown medially; segment I of abdomen wholly chalky white, II with an elongate lateral white mark starting at anterior margin and tapering out behind middle, V with a white lateral spot involving also its posterior dorsal angles; legs chestnut-brown, the tibiae darker, the hind femora obscurely yellowish brown ventrally; antennae with segments I and II almost white, III brownish yellow in about basal third, shading to chestnut-brown apically, IV-VIII rich blackish brown; prothoracic setae brownish yellow, the other major setae nearly or quite colorless.

Head a trifle broader across cheeks than across eyes, 1.5 times as long as greatest width, produced about 13 microns anteriorly, between eyes and base of antennae, so broadly rounded in front that the part anterior to hind margin of eyes forms a rough semicircle; cheeks full, narrowed to just in front of basal collar, where the width of the head is 0.59 that across eyes, the collar itself slightly wider; vertex typical, not at all produced or overhanging, curved

evenly downward to antennae, its surface finely but distinctly rugulose; frontal costa shallowly concave and very broad (70 microns); dorsum of head decidedly elevated between and behind eyes and faintly reticulate, the neck-like constriction much more heavily and darkly reticulate; all setae somewhat dilated at tip, the vertical pair longest (60 microns), situated distinctly in advance of front margin of eyes and 128 microns apart; interocellar pair about 36 microns long, 131 apart, and about opposite middle of eyes; postoculars about 43 microns long, 231 apart, arising about 66 behind eyes, and about comparable with a pair arising laterad and cephalad to them; dorso-cephalic or occipital pair about equal to interocellars, 120 microns apart, and 158 behind eyes (164 from posterior margin of head); genal setae similar but shorter, disposed in about 18 pairs. Eyes not protruding, prolonged ventrally, very slightly concave in front of the larger posterior facets, and very small in size, their dorsal length (118 microns) about 0.23 that of head, their ventral length (196 microns) about 0.38 the length of head. Ocelli wholly wanting. Antennae thoroughly typical of the genus, segments V and VI with the usual lobe-like ventral prolongations; all major setae pale and inconspicuous, most of those on segments I-III knobbed, all on IV-VIII pointed, a straight and outstanding pair on exact inner surface of I about 33 microns long; sense-cones short and rather stout, situated as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1<sup>+</sup> (1), V 1 (1<sup>+</sup>), VI 1 (0<sup>+</sup>), VII 1 dorsal. Mouth-cones short and nearly semicircularly rounded at tip, its length beyond posterior dorsal margin of head about 136 microns.

Prothorax along median line of pronotum scarcely 0.5 the length of head and contained in the trans-coxal width about 1.4 times; notum normal in form, elevated and very convex, its anterior margin perhaps slightly thickened, its posterior fourth curving abruptly downward, its entire surface (except in the few small areas where muscles are attached) with very distinct dark lines of sculpture, of which a very few along anterior margin, and those in posterior fourth, are transverse, the others longitudinal; midlateral setae minute and pointed, all others slightly dilated apically, the antero-marginals and antero-angulars 26-28 microns long, the others 31-32. Legs normal to the genus, fore tarsi toothed in the typical manner. Pterothorax much narrower than

either prothorax or head, its greatest width (across anterior angles of mesothorax) only 0.85 that across eyes; metanotum much elevated above mesonotum, forming a sharp longitudinal ridge; mesonotum conspicuously sculptured throughout with dark anastomosing lines which produce a subreticulated appearance, metanotum much more closely sculptured with dark, less-anastomosing lines which are essentially concentric; metanotum with two pairs of blunt setae (13 to 18 microns long) which lie in a transverse row across middle, the inner pair only 32 microns apart, the outer pair about 76 microns laterad of them.

Abdomen typical in form, broad and heavy, widened from base to segment V, where it is broadest, thence rounded to tube; tergum II subreticulate with dark fine lines in nearly all of its median portion; wing-retaining setae absent, terminal setae pointed and about 140 microns in length, all other major dorsal and lateral setae dilated (or at least blunt) at apex, the single pair on tergum I about 30 microns, the inner (and outer) pairs on succeeding terga measuring as follows in microns; II 52 (41), III 54 (46), IV 57 (41), V 54 (47), VI 70 (70), VII 107 (173), VIII 146 (138), IX 144 (186), the ventro-lateral pair on IX 165. Tube short and stout, 0.41 the length of head, twice as long as greatest subbasal width (which is across the basal collar), the latter dimension twice the least apical width, its sides just distinguishably concave, its tip somewhat narrowed, rather than constricted.

Measurements of female (holotype), in mm.: Length about 2.56 (fully distended, 3.18); head, total length 0.522, width across eyes 0.342, greatest width across cheeks 0.346, least width near base 0.202, width across basal collar 0.206; prothorax, median length of pronotum 0.244, width (inclusive of coxae) 0.350; pterothorax, width across anterior angles 0.291; abdomen, greatest width (at segment V) 0.487; tube (segment X, only), length 0.210, greatest subbasal width 0.106, least apical width 0.052.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	80	90	186	136	124	107	70	62
Width (microns):	61	41	43	47	43	37	31	20
Total length of antenna, 0.855 mm.								

FLORIDA: Big Pine Key, April 4, 1938, Professor J. Chester Bradley, 1 ♀, from dead branches of Pine.



This interesting species resembles *bradleyi* in having the abdomen pale and the tube largely yellow, but differs markedly in coloration and in the sculpture of the thorax and abdomen.

39. *Edalcothrips campestris*, sp. nov.

Female (apterous). -- Length about 2.6 mm. (fully distended, 3.1 mm.). Color blackish brown in thorax and base of head, the remainder of head black, the abdomen shading to black in segments IV-IX, the tube nearly black at tip and along sides, its median portion yellow; stigmal areas of mesothorax each with an underlying white spot, segment I of abdomen also with a chalky white spot on each side, which is connected with an elongate lateral one on II, these latter tapering out behind middle of the segment, V with a lateral white spot involving its posterior dorsal angles, all of these white markings distinct because the integument is colorless in the areas occupied; legs chestnut-brown, the tibiae darker and nearly black, the hind femora obscurely yellowish brown ventrally; antennae with segments I and II almost white, I lightly shaded with brown at base, III brownish yellow or golden yellow in about basal third, shading to blackish brown in about apical third, IV-VIII nearly black, IV paler and more brownish than those beyond; major setae nearly or quite colorless.

Head a trifle broader across eyes than across cheeks, fully 1.5 times as long as greatest width, produced about 10 microns anteriorly, between eyes and base of antennae, broadly rounded in front; cheeks full, narrowed to just in front of basal collar, where the width of the head is less than 0.6 that across eyes, the collar itself slightly wider; vertex typical, not at all produced or overhanging, curved evenly downward to antennae, its surface finely but distinctly rugulose; frontal costa shallowly concave and broad (61 microns); dorsum of head decidedly elevated between and behind eyes and faintly reticulate, the neck-like constriction more heavily and darkly reticulate; all setae somewhat dilated at tip, the vertical pair longest (53 microns), situated distinctly in advance of front margin of eyes and 121 microns apart; interocellar pair about 32 microns long, 120 apart, and about opposite middle of eyes; postoculars about 33 microns long, 211 apart, arising about 63 behind eyes, and about comparable with a pair arising laterad and cephalad to them; dorso-

cephalic or occipital pair about equal to interocellars, 110 microns apart, and 143 behind eyes (151 from posterior margin of head); genal setae similar but shorter, disposed in 6-8 pairs. Eyes not protruding, prolonged ventrally, very slightly concave in front of the larger posterior facets, and very small in size, their dorsal length (109 microns) about 0.22 that of head, their ventral length (185 microns) about 0.37 the length of head. Ocelli wholly wanting. Antennae thoroughly typical of the genus, segments V and VI with the usual lobe-like ventral prolongations; all major setae pale and inconspicuous, some or most of those on segments I-III knobbed, all on IV-VIII pointed, an outstanding pair on exact inner surface of I about 29 microns long; sense-cones short and rather stout, situated as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (1), V 1 ( $1^{+1}$ ), VI 1 ( $0^{+1}$ ), VII 1 dorsal. Mouth-cone short and nearly semicircularly rounded at tip, its length beyond posterior dorsal margin of head about 154 microns in holotype.

Prothorax along median line of pronotum about 0.5 the length of head and contained in the trans-coxal width about 1.4 times; notum normal in form, elevated and very convex, its posterior fourth curving abruptly downward, its entire surface (except in the few small areas where muscles are attached) with lines of sculpture, of which those in posterior fourth are transverse and more distinct, the others longitudinal and very faint in middle of disk; midlateral setae minute and pointed, all others slightly dilated apically and 27-36 microns long. Legs normal to the genus, fore tarsi toothed in the typical manner. Pterothorax much narrower than either prothorax or head, its greatest width (across anterior angles of mesothorax) scarcely 0.9 that across eyes; metanotum much elevated above mesonotum, forming a slight longitudinal ridge whose sides are convex, rather than concave; mesonotum sculptured throughout with dark anastomosing lines which are much less distinct posteriorly, metanotum much more closely sculptured with lines that are darker, heavier, less anastomosing, and essentially concentric; metanotum with two pairs of blunt setae (15 to 23 microns long) which lie in a transverse row across middle, the inner pair only 40 microns apart, the outer pair about 75 microns laterad of them.

Abdomen typical in form, broad and heavy, widened from base to segment V, where it is broadest, thence rounded to tube; wing-retaining setae absent, terminal setae pointed and about 133 microns in length, all other major dorsal and lateral setae dilated (or at least blunt) at apex; IX with seta I 123 microns, II 151, III 160. Tube short and stout, scarcely 0.4 the length of head, 1.7 times as long as greatest subbasal width (which is across the basal collar), the latter dimension about twice the least apical width, its sides straight, than concave, its tip somewhat narrowed, rather than constricted.

Measurements of female (topotypic paratype, caustic-treated), in mm.: Length about 2.63 (fully distended, 3.22); head, total length 0.500, width across eyes 0.322, greatest width across cheeks 0.315, least width near base 0.189, width across basal collar 0.196; prothorax, median length of pronotum 0.245, width (inclusive of coxae) 0.377; pterothorax, width across anterior angles 0.288; abdomen, greatest width (at segment V) 0.511; tube (segment X, only), length 0.199, greatest subbasal width 0.115, least apical width 0.056.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	75	84	158	114	110	100	63	60
Width (microns):	60	42	43	47	44	38	32	19
Total length of antenna, 0.764 mm.								

Male: (apterous). — Like the female in color and general structure, but with the head notably slenderer and the fore legs of larger individuals enlarged.

Measurements of male (topotypic paratype, caustic-treated), in mm.: Length about 2.6 (fully distended, 3.04); head, total length 0.504, width across eyes 0.288, greatest width across cheeks 0.274, least width near base 0.178, width across basal collar 0.186; eyes, dorsal length 0.113, dorsal width 0.064, dorsal interval 0.161, ventral length 0.171, ventral interval 0.153; postocular setae, length 0.045, interval 0.193, distance from eyes 0.074; vertical setae, length 0.046, interval 0.103; interocellar setae, length 0.029, interval 0.096; occipital setae, length 0.034, interval 0.110; mouth-cone, extent beyond posterior dorsal margin of head 0.118; prothorax, median length of pronotum 0.282, width (inclusive of coxae) 0.391; prothoracic setae: antero-marginals 0.030, antero-angulars 0.034, epimerals 0.029, postero-marginals 0.042, coxals 0.035; mesothorax, width across anterior angles 0.311; abdomen, greatest

width (at segment V) 0.511; tube (segment X, only) length 0.217, greatest subbasal width 0.119, least apical width 0.056; seta I on segment IX, length 0.134, II 0.162, III 0.168; terminal setae, length 0.150.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	81	82	153	113	106	93	57	56
Width (microns):	60	39	44	45	42	37	28	19
Total length of antenna, 0.741 mm.								

TEXAS: El Campo, April 18, 1939, J. D. H., 8 ♀♀ and 6 ♂♂ (including holotype and allotype), from grass; Palacios, March 25, April 4, and April 23, 1939, J. D. H., 4 ♀♀ and 5 ♂♂, from grasses.

FLORIDA: Sebring, April 7, 1938, John W. H. Rehn, 1 ♂, from grass.

Though this species suggests *hookeri* in the general color of the body and head, it may be separated by certain details of coloration and by the form of the tube.

40. *A. daleothrips baileyi*, sp. nov.

Female (apterous). — Length about 2.5 mm. (fully distended, 3.2 mm.). Color nearly uniform black, with tarsi, trochanters, and middle and hind femora paler; segment I of abdomen wholly chalky white, II with an elongate lateral white mark which starts at anterior margin and tapers out near middle; V with a lateral white spot which extends onto its posterior dorsal angles; antennae with segments I-III pale whitish yellow, I abruptly blackish brown in basal two-fifths, III with a brown cloud in basal third but not darkened apically, IV-VIII rich blackish brown, IV somewhat paler than the others; major setae nearly or wholly colorless, excepting for their darkened bases.

Head a trifle broader across cheeks than across eyes, 1.5 times as long as greatest width, scarcely produced anteriorly, so broadly rounded in front that the part anterior to hind margin of eyes forms a rough semicircle; cheeks full, narrowed to just in front of basal collar, where the width of the head is 0.65 that across eyes, the collar itself slightly wider; vertex typical, not at all produced or overhanging, curved evenly downward to antennae, its surface rugulose; frontal costa perfectly flat and moderately broad (54 microns); dorsum of head decidedly elevated between and behind eyes,

the neck-like constriction heavily and darkly reticulate; all major setae somewhat dilated at tip and disposed as usual in this genus, the genal setae shorter and pointed. Eyes not protruding, prolonged ventrally, very slightly concave in front of the larger posterior facets, and very small in size, their dorsal length (97 microns) about 0.21 that of head. Ocelli are wholly wanting. Antennae thoroughly typical of the genus, segments V and VI with the usual lobe-like ventral prolongations; all major setae pale, inconspicuous, and pointed; sense-cones short but slender, situated as follows on inner (and outer) surfaces of segments: III 0 (1), IV 1 (1), V 1 ( $1^{+1}$ ), VI 1 ( $0^{+1}$ ), VII 1 dorsal. Mouth-cone short and nearly semicircularly rounded at tip, its length beyond posterior dorsal margin of head about 160 microns.

Prothorax along median line of pronotum scarcely 0.52 the length of head and contained in the trans-coxal width about 1.6 times; notum normal in form, elevated and very convex, its anterior margin perhaps slightly thickened, its posterior fourth curving abruptly downward; midlateral setae minute and pointed, all others slightly dilated apically and 30-45 microns long. Legs normal to the genus, fore tarsi toothed in the typical manner. Pterothorax narrower than either prothorax or head; metanotum much elevated above mesonotum, forming a slight longitudinal ridge whose sides are convex, rather than concave; mesonotum indistinctly sculptured; metanotum conspicuously sculptured with dark, anastomosing lines which are mostly longitudinal, those behind the ridge not transverse, and with one pair of blunt major setae, these about 25 microns long and 121 apart.

Abdomen typical in form, broad and heavy, widened from base to segments IV and V, where it is broadest, thence rounded to tube; terminal setae pointed and about 84 microns in length, all other major dorsal and lateral setae dilated (or at least blunt) at apex, excepting only the dorsal pair on IX, which is pointed and 137 microns long, the second and third pairs on this segment respectively 122 and 126 microns. Tube short and stout, 0.39 the length of head, about 1.7 times as long as greatest subbasal width (which is across the basal collar), the latter dimension 2.1 times the least apical width, its sides slightly concave, its tip neither narrowed nor constricted.

Measurements of female (holotype), in mm.: Length about 2.54 (fully distended, 3.16); head, total length 0.459, width across eyes 0.298, least width just behind eyes 0.286, greatest width across checks 0.301, least width near base 0.193, width across basal collar 0.202; prothorax, median length of pronotum 0.239, width (inclusive of coxae) 0.385; abdomen, greatest width (at segments IV and V) 0.524; tube (segment X, only), length 0.178, greatest subbasal width 0.108, least apical width 0.051.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	53 <sup>*</sup>	88	134	109	103	86	63	51
Width (microns):	48	45	47	47	43	39	32	23
Total length of antenna, 0.690 mm.								

KANSAS: Topeka, July 3, 1938, Dr. Stanley F. Bailey, 1 ♀, «on person, in park».

Allied to *jacksoni*, which it resembles closely in color, but differing markedly in the lower and less-pointed metanotum, which is not concentrically striate.

It is named after its collector, to whom I am indebted for several real favors

#### 41. *Trachythrips epimeralis*, sp. nov.

Female (apterous). — Length about 1.2 mm. (fully distended, 1.37 mm.). Color pale straw-yellow, with head, most of prothorax, all of mesothorax, and extreme apex of tube, dark blackish brown, the prothorax with a semicircular white blotch occupying its anterior portion, abdominal segments II-VIII with their lateral fourths brown, II-IX each with a median brown spot (small and indistinct on VII and VIII), IX narrowly darkened along sides; fore femora straw-yellow, remainder of legs brown, the middle and hind tibiae darkened laterally; antennae pale yellow, segment V lightly washed with brown, VI brown, darker along sides; internal pigmentation red and white, the former distributed along sides of head and body, underlying the dark dorso-lateral abdominal spots and occupying the vertex and the darker parts of prothorax, most of mesothorax, and, to some extent, the median line of abdomen, the white pigmentation opaque, conspicuous when observed by reflected light, forming the

<sup>\*</sup>) Dorsal exposed length.

white pronotal blotch and a band across metathorax and abdominal segments I-VII (on the latter more or less broken at median line).

Head nearly 1.5 times as long as greatest width exclusive of tubercles, broadest just behind basal fourth, cheeks straight (or even slightly concave) behind the posterior margin of eyes; vertex bilobed, broadened anteriorly, produced 27 microns beyond eyes, its greatest width 41 microns, the depth of its median notch 12 microns; callosities in the median area very indistinct. Eyes normal; ocelli absent, as in all members of the family. Antennae unusual in that they are 6-segmented, the additional segment being the morphological third, which is separated by a distinct suture from the morphological fourth (which is completely fused with the morphological fifth).

Prothorax with median line of pronotum about one-half as long as head and contained distinctly more than twice in the trans-coxal breadth; sculpture normal though much weaker than in genotype; no major setae present, except epimerals, these brown, outstanding, broadened apically, 15 microns long and at apex one-third as broad. Pterothorax much broader than prothorax and somewhat narrower than abdomen. Legs normal; fore tarsi with the usual claw on outer surface.

Abdomen broadest at segment II, normal in form and structure; tube (segment X, only) distinctly longer than IX, about three-fourths the length of head and 4.5 times as long as greatest width.

Measurements of female (holotype), in mm.: Length about 1.18 (fully distended, 1.37); head, total length 0.200, width across broadest part of eyes 0.115, greatest width across cheeks (exclusive of tubercles) 0.137, least width near base 0.131, width across basal collar 0.134; eyes, dorsal length 0.043; mouth-cone, length beyond posterior dorsal margin of head 0.065; prothorax, median length of pronotum 0.103, width (inclusive of coxae) 0.224; mesothorax, width across anterior angles 0.192; metathorax, greatest width 0.269; abdomen, greatest width 0.274; tube (segment X, only), length 0.150, subbasal width 0.033, least apical width 0.026; seta at posterior angle of segment IV 0.038; terminal setae 0.574.

Antennal segments:	1	2	3	4	5	6
Length (microns):	26	34	31	59	31	41

Width (microns): 24 33 28 34 18 15

Total length of antenna, 0.222 mm.

**BRAZIL:** Annapolis, Goyaz, August 27, 1936, 1 ♂, Genipapo.<sup>9</sup>

This species, it seems to me, is especially interesting in three respects: (1) It is the only member of its genus with a well-developed prothoracic (epimeral) seta; (2) its antennae are six-segmented, like those of the Floridan *seminole*, while all of the other species have only five antennal segments; (3) and yet, in spite of this, its coloration and the unusual form of the head are almost identically the same as those of the Panamanian *frontalis*, which is not related to *seminole*!

42. *Cephalothrips hesperus*, sp. nov.

**Female** (brachypterous). — Length about 1.3 mm. (fully distended, 1.6 mm.). Color of head, thorax, and abdomen dark brown, more or less blackish, especially in head and last few abdominal segments; internal pigmentation red and more abundant toward tip of abdomen and in tube; legs concolorous with body, excepting tarsi and the apical third or more of all tibiae, which are clear, pale, whitish yellow; antennae with segments I and II darkest and concolorous with head, I slightly paler basally, II paler at middle though not at apex, III-VIII dark brown, with the narrow basal portions of III-V dark yellow; all major setae colorless, excepting the brown terminal ones and those on abdominal segments VII-IX, which are pale brown at base.

**Head** large, 1.3<sup>10</sup> times as long as greatest width, which is near middle of cheeks, the latter minutely, but very distinctly and rather evenly, serrate as seen from above, evenly rounded to eyes and to a slight subbasal constriction in front of a distinct, though slight, basal collar; vertex rounded, produced, and slightly overhanging; postocular setae moderately stout, decidedly broadened apically, 24 microns long, 129 apart, and arising about 16 microns from nearest facet of eyes; all

<sup>9</sup>) I cannot recall the source from which this specimen came to me. Father Borgmeier has confirmed the location of Annapolis in the State of Goyaz, Brazil, and provides the additional information that Genipapo is a Rubiaceous plant, *Genipapa americana* L. It is highly unlikely that the thrips feeds directly upon the plant, however.

<sup>10</sup>) The single specimen upon which this description is based may possibly have been slightly flattened as the result of cover-glass pressure, though the proportions can not have been very seriously affected.



other cephalic setae minute, pointed, and colorless, their trichopores pale and conspicuous; dorsal surface of head cross-striate in most of the area posterior to eyes. Eyes not at all protruding, about 0.32 the length of head (dorsal length about 73 microns), ventrally not at all produced and only 56 microns long. Ocelli wanting. Antennae normal for the genus, with segment II longest and VI-VIII rather closely united because of the broad bases of VII and VIII; sense-cones short and stout (that on inner surface of IV about 17 microns long), disposed as follows on inner (and outer) surfaces of segments: III 0 (1), IV 1 (1), V and VI each 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cone broadly rounded at tip, extending about 103 microns beyond posterior dorsal margin of head; second segment of maxillary palpi 34 microns long.

Prothorax along median line of pronotum fully 0.5 the length of head and (inclusive of coxae) about twice as wide as long<sup>11</sup>, without median apodeme, distinctly cross-striate posteriorly; major setae all present, their trichopores pale and conspicuous, antero-marginals pointed and 15 microns long, the others stout and broadly dilated apically, the antero-angulars 24, midlaterals 20, epimerals 31, postero-marginals 21, coxals 18, the epimerals stoutest and 10 microns broad across the apical dilation. Pterothorax normal, mesonotum with dark, parallel cross-striae in anterior half; metanotum smooth at middle, subreticulate at sides. Legs short and relatively slender, fore tarsi with a small acute tooth on inner surface. Wings colorless, about 112 microns long, with two colorless, broadly dilated, subbasal setae which are about 17 microns long and sometimes as much as 7 microns broad apically.

Abdomen distinctly broader than pterothorax but less than 1.2 times the width of prothorax across coxae; dorsal surface with dark lines of subreticulation in tergum I, more or less distinctly cross-striate in II and at sides of the more basal of remaining terga; major setae stout, nearly all of them broadly expanded at tip, the terminal ones and seta III on segment IX pointed, setae I and II on IX each 53 microns long and dilated, III 57, terminal ones 83. Tube (segment X, only) only 0.42 as long as head and about 1.5

<sup>11</sup>) See footnote 10.

times as long as greatest subbasal width, this about twice the apical width, sides somewhat convex basally.

Measurements of female (holotype), in mm.: Length about 1.27 (fully distended, 1.59); head, total length 0.228, greatest width across eyes 0.159, least width just behind eyes 0.157, greatest width across cheeks 0.176, least width near base 0.165, width across basal collar 0.167; prothorax, median length of pronotum 0.117, width (inclusive of coxae) 0.242; mesothorax, width across anterior angles 0.220; abdomen, greatest width (at segment IV) 0.277; tube (segment X, only), length 0.095, greatest subbasal width 0.063, least apical width 0.030.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	36	51	42	49	49	46	37	30
Width (microns):	29	28	25	27	27	26	23	15
Total length of antenna, 0.343 mm								

CALIFORNIA: Coalinga, August 6, 1927, J. D. H., 1 ♀, from oak.

*Cephalothrips monilicornis* (Reuter)<sup>12</sup>, the only other species of the genus known to occur in the Western Hemisphere, has a much longer tube, stouter antennae, ventrally prolonged eyes, slenderer setae, and lighter sculpture.

#### 43. *Plectrothrips longisetis*, sp. nov.

Male (macropterous). — Length about 1.6 mm. (fully distended, 1.93 mm.). Color of head and thorax brownish yellow, the head blackish brown across front and very narrowly so along cheeks, the prothorax lightly shaded with brown posteriorly (this shading involving the pronotum, epimeron, episternum, and the membranous areas, but not the

<sup>12</sup> *Cephalothrips monilicornis* (Reuter) was described from Finland in 1879, placed in the new genus *Cephalothrips* by Uzel in 1895, and subsequently recorded from the British Isles, most of the continent of Europe, and British Columbia. It is a common species in New York. Material is before me from Benson Mines, Oswegatchie, Ithaca, and several other points in Tompkins and St. Lawrence Counties. Macropterous individuals are commonly taken in July and August. Nymphs, but no males, have been seen. Specimens from several points in England, and from Austria, Hungary, Italy, and British Columbia, have been compared, together with my New York material, with three authenticated specimens from Pargas, Finland, sent to me a number of years ago by Professor O. M. Reuter.

fore coxae) and with the median apodeme and that along posterior margin of pronotum nearly black, the pterothorax narrowly black laterally, the abdomen brownish yellow in segment I, bright yellow in the next few segments, and golden yellow apically, with the tube bright brownish orange; antennae with segment I light brown, II golden yellow, III yellow in about basal half and brown apically, IV-VIII brown, IV paler in basal half, V-VIII with pedicels yellowish; legs bright yellow, with hind femora narrowly brownish along anterior margin; wings very pale yellowish brown, distinguishably darker at base; ocellar pigmentation maroon-red.

Head relatively long and slender, its total length about 1.21 times its greatest width across cheeks, the width across eyes only slightly less; cheeks broadest and subangulate at anterior fourth, slightly concave between this point and eyes, straight and tapering between it and base; vertex not produced or overhanging, but sloping evenly downward to antennal bases; dorsum of head smooth except for a small patch of faint, anastomosing striae on either side, at base; postocular setae yellow, short (43 microns), pointed, arising close to sides of head (132 microns apart) opposite anterior third of cheeks (33 microns from nearest facet of eyes, 60 from base of head); other cephalic setae minute, colorless, and pointed. Eyes nearly 0.4 the length of head, not protruding, much narrower than their interval, dorsal length 75 microns. Ocelli normal, large (about 14 microns in diameter), the posterior pair widely separated (60 microns apart) and encroaching upon the eyes (as is usual in this genus), the median ocellus situated in the usual position (between the bases of antennae) and with its anterior margin about 7 microns in advance of posterior margin of antennal foveae and 10 microns in advance of eyes. Antennae thoroughly typical, the segments formed as usual in the genus; sense-cones moderately large (the lower one on outer surface of segment IV about 28 microns long), finger-shaped, and disposed as follows on inner (and outer) surfaces of segments: III 1 (1), IV 2 (2), V and VI 1 (1+1), VII 1 dorsal. Mouth-cone typical, short, broadly rounded apically, and extending about 72 microns beyond posterior dorsal margin of head.

Prothorax along midline of pronotum about 0.8 the total length of head and contained in the trans-coxal breadth

about twice, its surface without sculpture; epimeral and coxal setae respectively 86 and 60 microns long, both pairs yellow and pointed, all other setae minute, colorless, and pointed. Pterothorax normal, narrower than prothorax across coxae. Wings about 0.85 mm. long, normal in structure, with 7-8 accessory setae and with the minute, pointed, subbasal setae respectively about 9, 14, and 23 microns long. Legs normal, the fore pair enlarged, the hind femora slightly swollen, middle and hind tibiae with the usual spurs, fore tarsi strongly toothed; fore tibiae without tubercle on inner surface at apex.

Abdomen normal in structure, broadest in segments III and IV, its width at this point greater than that of pterothorax but less than that of prothorax, its surface smooth except for widely-spaced striae on tergum I and light subreticulation at sides of other segments; tube (segment X, only) about 0.73 the length of head, twice as long as greatest breadth near base, and about one-half as wide at apex, swollen in basal third, sides parallel to near apex, sharply narrowed apically; setae on segment IX long, seta I (146 microns) about equal in length to tube, seta II 70 microns, III 207, terminal setae 239.

Measurements of male (holotype), in mm.: Length about 1.62 (fully distended, 1.93); head, total length 0.194, width across eyes 0.148, least width just behind eyes 0.143, greatest width across cheeks 0.150, width across basal collar 0.128; prothorax, median length of pronotum 0.154, width (inclusive of coxae) 0.319; pterothorax, width across anterior angles 0.263, greatest width 0.280; abdomen, greatest width (at segments III-IV) 0.291; tube (segment X, only), length 0.143, greatest subbasal width 0.073, least apical width 0.035.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	51	46	50	49	49	43	48
Width (microns):	10	33	33	35	29	25	20	13
Total length of antenna, 0.373 mm.								

FLORIDA: Homestead, April 6, 1938, Professor J. Chester Bradley, 1 ♂, from dead branches.

From *antennatus*, the genotype and only other North American species of the genus, this may be distinguished by the different arrangement of the antennal scise-cones.

#### 44. *Plectrothrips latus*, sp. nov.

Male (brachypterous). — Length about 1.4 mm. (slightly

distended, 1.51 mm.). Color bright golden yellow, with scattered bright red internal pigmentation, the integument darkening to orange-yellow in tube, the head shaded with brown in anterior half, especially across front, the intersegmental membrane behind pronotum, and also the median apodeme, brown; legs bright golden yellow; antennae with segment I pale brown, II and III pale yellow, and IV-VIII yellow, but lightly shaded with gray, especially apically, V somewhat darker than the others; ocellar pigmentation maroon-red,

Head relatively short and broad, its total length negligibly greater than the width across cheeks, the width across eyes distinctly less; cheeks evenly arcuate, broadest at anterior third, distinctly and roundly converging to tube; vertex not produced or overhanging, but sloping evenly downward to antennal bases; dorsum of head smooth except for a small patch of faint anastomosing striae on either side at base; postocular setae yellow, short (43 microns), pointed, arising close to sides of head (139 microns apart) opposite anterior third of cheeks (32 microns from nearest facet of eyes, 56 from base of head); other cephalic setae minute, colorless, and pointed. Eyes about 0.34 the length of head, not protruding, about one-third as wide as their interval, dorsal length 53 microns, dorsal width 30, dorsal interval 86 (the last two measurements approximate). Ocelli normal, large (13-14 microns in diameter), the posterior pair widely separated (60 microns apart) and encroaching upon the eyes (as is usual in this genus), the median ocellus situated in the usual position (between the bases of antennae) and with its anterior margin about 3 microns in advance of posterior margin of antennal foveae and 8 microns in advance of eyes. Antennae thoroughly typical, the segments formed as usual in the genus; sense-cones relatively small (the lower one on outer surface of segment IV about 16 microns long), finger-shaped, and disposed as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2), V 1 ( $1^{+1}$ ), VI 1 ( $1^{+1}$ ), VII 1 dorsal. Mouth-cone typical, short, broadly rounded apically, and extending about 96 microns beyond posterior dorsal margin of head.

Prothorax large, its length along midline of pronotum 1.1 times the total length of head and contained in the trans-coxal breadth about 1.9 times, its surface without sculpture; epimeral and coxal setae respectively 78 and 66 microns

long, both pairs yellow and pointed, all other setae minute, colorless, and pointed. Pterothorax normal, narrower than prothorax across coxae. Wings about 129 microns long, extending about to base of abdomen. Legs normal, the fore pair enlarged, the hind femora distinctly swollen, middle and hind tibiae with the usual spurs, fore tarsi strongly toothed, in the usual manner; fore tibiae with distinct tubercle on inner surface at apex.

Abdomen normal in structure, broadest in segment IV, its width at this point greater than that of pterothorax and about equal to that of prothorax, its surface smooth except at sides of other segments; tube (segment X, only) about 0.76 the length of head, 1.6 times as long as greatest breadth near base, and about one-half as wide at apex, slightly swollen in basal third, sides somewhat concave beyond, tapering to near the rather sharply narrowed apex; upper two pairs of setae on segment IX short (respectively 87 and 47 microns long), the former pair thus about three-fourths the length of tube; seta III on segment IX 168 microns, terminal setae only 86.

Measurements of male (holotype), in mm.: Length about 1.41 (slightly distended, 1.51); head, total length 0.157, width across eyes 0.146, greatest width across cheeks 0.154, width across basal collar 0.138; prothorax, median length of pronotum 0.177, width (inclusive of coxae) 0.333; pterothorax, width across anterior angles 0.290; abdomen, greatest width (at segment IV) 0.335; tube (segment X, only), length 0.120, greatest subbasal width 0.073, least apical width 0.034.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	41	50	46	43	40	39	41	10
Width (microns):	39	33	34	35	30	25	19	14
Total length of antenna, 0.340 mm.								

PANAMA: Barro Colorado Island, Canal Zone, July 29, 1933, James Zetek and J. D. H., 1 ♂, from dead branches.

The stout body, head, and antennae of this species, its pale coloration, and the short terminal setae, should separate it readily from its allies.

#### 45. *Eurythrips pettiti*, sp. nov.

Female (brachypterous). — Length about 1.5 mm. (fully distended, 2.0 mm.). Color of head and thorax light yellowish

brown, with head more yellowish and pterothorax blackish along anterior and lateral surfaces, the abdomen nearly black in segments IV-X and largely yellow in I-III, I shaded with brown anteriorly, II uniform pale yellow, III brown medially and golden yellow laterally, IX somewhat paler medially and along anterior margin, X (the tube) paler at extreme base and in about apical two-fifths; legs uniform pale brownish yellow; antennae nearly uniform dark brown, segment I paler at base, II paler medially beyond base, III-VI with pedicels pale; all major setae pale brownish yellow, terminal ones darker.

Head moderately long, its length 1.2-1.27 times the greatest width across cheeks and 1.3-1.4 times the width across eyes; cheeks nearly parallel in posterior two-thirds, strongly converging to eyes and only slightly narrowed in front of basal collar; vertex and median basal portion of head lightly subreticulate with pale lines, the cheeks with transverse striae whose edges tend to overhang and to become produced into distinct tubercles; postocular setae with rounded apical dilations, 60-70 microns long, 98 apart, and 12 from nearest facet of eyes; occipital setae minute, slender, and pointed; vertex and occiput slightly elevated, the former subconical, slightly produced, and somewhat overhanging. Eyes rounded, strongly protruding, coarsely faceted, about 0.23 the length of head, 46 microns in dorsal length. Ocelli 15-16 microns in diameter, the median one with its anterior margin about 15 microns in advance of that of eyes. Antennae normal, almost identical with those of its closest allies, all major setae pointed, segments II-V indistinctly reticulate, none of the apical segments united with another; sense-cones slender, pointed, nearly straight, disposed as follows on the inner (and outer) surfaces of the segments: III 1 (1), IV 1 (2), V and IV 1 (1<sup>1</sup>), VII 1 dorsal. Mouth-cone moderately large, broadly rounded at tip, extending 90-96 microns beyond posterior dorsal margin of head when the latter is horizontal.

Prothorax along median line of pronotum about 0.67 the length of head and contained about 2.1 times in the trans-coxal width, its anterior margin somewhat thickened; dorsal surface transversely striate along posterior margin; epimeron fused with pronotum; antero-marginal setae minute and pointed, the others with apex dilated and rounded, antero-angulars 54-65 microns long, midlaterals 60-76, epimerals

72-82, postero-marginals 50-84, coxals 43-50. *Pterothorax* narrower than prothorax, without ventro-lateral knobbed setae. Legs striate, not reticulate, fore tarsi with a distinct acute tooth at apex of first segment. Wings about 124 microns long, each fore one with two apically dilated setae which are 58-64 microns in length.

Abdomen moderately large and heavy, about 1.4 times as broad as prothorax across coxae; most setae, excepting the terminal and wing-retaining ones, distinctly dilated apically, the lateral seta on VII about 80 microns long, IX with setae I and II dilated apically and 100-110 microns long, III pointed and 83 microns; terminal setae about 70 microns long; tube (segment X, only) about 0.74 the length of head, nearly twice as long as greatest subbasal width, the latter about twice the apical width, its sides straight.

Measurements of female (holotype), in mm.: Length about 1.54 (fully distended, 1.98); head, total length 0.196, width across eyes 0.139, least width just behind eyes 0.128, greatest width across cheeks 0.154, least width near base 0.147, width across basal collar 0.151; prothorax, median length of pronotum 0.132, width (inclusive of coxae) 0.283; mesothorax, width across anterior angles 0.266; abdomen, greatest width (at segment IV) 0.406; tube (segment X, only), length 0.145, greatest subbasal width 0.075, least apical width 0.037.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	45	58	70	64	59	57	47	42
Width (microns):	42	33	34	33	30	27	24	15
Total length of antenna, 0.442 mm.								

Male (brachypterous). — Nearly identical in coloration and structure with female, though smaller and more slender; tarsal tooth stronger; sternum VIII of abdomen with the glandular area in the form of a broad band which occupies about one-half the length of the segment.

Measurements of male (allotype), in mm.: Length about 1.2 (fully distended, 1.51); head, total length 0.162, width across eyes 0.124, least width just behind eyes 0.120, greatest width across cheeks 0.133, least width near base 0.128, width across basal collar 0.131; postocular setae, length 0.052, interval 0.096; mouth-cone, length beyond posterior dorsal margin of head 0.089; prothorax, median length of pronotum 0.127, width (inclusive of coxae) 0.252; antero-angular setae, length 0.053-0.066, midlaterals 0.063, epimerals 0.060-



0.064, postero-marginals 0.065-0.066, coxals 0.036; mesothorax, width across anterior angles 0.225; abdomen, greatest width (at segment III) 0.288; tube (segment X, only), length 0.113, greatest subbasal width 0.062, least apical width 0.033; seta I on segment IX, length 0.087, II 0.053, III 0.096.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	49	57	51	53	52	41	39
Width (microns):	36	30	30	29	27	24	22	14
Total length of antenna, 0.379 mm.								

VIRGINIA: New Market, January 5, 1941, Dr. Lincoln C. Pettit, 2 ♀♀ and 1 ♂.

Readily known from *cinctus*, which it resembles somewhat in coloration and structure, by the apically-dilated major setae. It is named for my good friend Dr. Lincoln C. Pettit, Instructor in Biology at Washington and Lee University, in recognition of the careful, productive collecting which he has done in the State of Virginia.

#### 46. *Phthirotithrips morgani*, sp. nov.

Female (apterous). — Length about 0.8 mm. (fully distended, 1.1 mm.). Color nearly uniform brown, scarcely blackish, except for the tube, which is darkest but much paler at base and slightly paler apically; legs concolorous with body; antennae with segment I slightly paler than head, especially basally, II palest and nearly yellow apically, III pale but darker than II, IV-VII dark grayish brown, VII darker at apex.

Head about as long as greatest width, which is across the eyes, the cheeks nearly straight and parallel, somewhat narrowed at basal third; dorsal surface without cross-striae, save for the usual subbasal line, the profile of cheeks smooth throughout; vertex rounded, not at all produced or overhanging; postocular setae light brown, slender, and pointed, their length about 36 microns, interval 66; all other cephalic setae minute, pale, and pointed. Eyes slightly protruding, their dorsal length about 35 microns. Ocelli wanting. Antennae seven-segmented, without trace of suture between the morphological seventh and eighth segments, but otherwise typical, with segment III shortest and narrower than its neighbors; sense-cones rather large and distinct, arranged as follows on inner (and outer) surfaces of segments: III 0 (0), IV 1 (1), V 1 (1), VI 1 (1<sup>+</sup>), VII 1 dorsally. Mouth-cone large, heavy, semicircularly rounded at apex and extending

about 80 microns beyond posterior dorsal margin of head when the latter is horizontal.

**Prothorax** with median length of pronotum approximately equal to that of head and contained in the trans-coxal width about 2.6 times, without trace of median apodeme, surface perfectly smooth; major setae brown, long, and very slightly dilated apically, the antero-marginals about 25 microns, antero-angulars 32, midlaterals 36, epimerals 52, postero-marginals 47, coxals 51. **Pterothorax** much narrower than prothorax. Legs typical in form, short, fore femora not enlarged, fore tarsi unarmed. Wings wholly wanting.

**Abdomen** large, heavy, smooth, broadest at segment IV, where the width is about 1.2 times that of prothorax across coxae; terga I and II each with one pair of long, dark, slightly dilated setae which measure 36 and 66 microns, respectively; terga III-VIII each with two pairs of long major dorso-lateral setae, of which the outer on VII is hair-like, pointed, and 85 microns long, the others either blunt or slightly dilated at tip; setae on IX long and pointed, I 120 microns long, II 113, III 94. **Tube** (segment X, only) about 0.85 the length of head and only 1.35 times as long as greatest width near base, which is about twice the apical width, sides nearly straight; terminal setae brown, about equal in length to tube.

**Measurements** of female (holotype, caustic-treated), in mm.: Length about 0.8 (fully distended, 1.08); head, total length approximately 0.090, width across eyes 0.090; prothorax, median length of pronotum 0.095, width (inclusive of coxae) 0.247; mesothorax, width across anterior angles 0.200; abdomen, greatest width (at segment IV) 0.288; tube (segment X, only), length 0.077, greatest subbasal width 0.057, least apical width 0.028; terminal setae, length 0.082.

Antennal segments:	1	2	3	4	5	6	7
Length (microns):	26	35	23	25	30	37	60
Width (microns):	28	27	19	23	24	22	19
Total length of antenna, 0.236 mm.							

**Male** (apterous). — Apparently identical with female in coloration and very similar to it in structure; prothorax proportionately larger and much longer; all major setae pointed; seta II on abdominal segment IX reduced in size; sternum VIII with the glandular area in the form of a straight narrow line, 7 microns wide, extending across it behind middle.

Measurements of male (allotype). in mm.: Length about 0.76 (fully distended 0.94); head, total length 0.090, width across eyes 0.090, least width just behind eyes 0.086, greatest width across cheeks 0.088, least width near base 0.082, width across basal collar 0.085; eyes, dorsal length 0.033; postocular setae, length 0.031, interval 0.064; mouth-cone, length beyond posterior dorsal margin of head 0.080; prothorax, median length of pronotum 0.113, greatest width (inclusive of coxae) 0.214; antero-marginal setae, length 0.021, antero-angulars 0.023, midlaterals 0.035, epimerals 0.043, postero-marginals 0.045, coxals 0.054; pterothorax, width across anterior angles 0.172; abdomen, greatest width (at segment II) 0.203; tube (segment X, only), length 0.069, greatest subbasal width 0.049, least apical width 0.024; seta I on segment IX, length 0.084, II 0.030, III 0.103; terminal setae, length 0.064.

Antennal segments:    1    2    3    4    5    6    7

Length (microns):    25   34   21   25   29   36   59

Width (microns):    27   25   17   23   22   20   19

Total length of antenna, 0.229 mm.

FLORIDA: Hogtown Creek, near Gainesville, March 19, 1933, Professor J. R. Watson, 1 ♀, in Reindeer Moss. Alachua County (Sugarfoot Hammock), February 5, 1939, J. R. Watson, 1 ♂, in dead leaves on ground.

In spite of the limited amount of material in the type series, this is apparently a common enough species in the south, and is the one which the late A. C. Morgan distributed many years ago under the manuscript name *Lulissothrips antennatus*. I have myself known the species for perhaps a score of years, but the two specimens here described are the only ones in sufficiently good condition to describe. It is appropriate that the species be named for Mr. Morgan, who seemingly thought that he had described it.

From its two congeners, known respectively from Liberia and Brazil, it differs in having truly seven-segmented antennae, without the slightest trace of a suture between the morphological seventh and eighth segments.

#### 47. *Elaphrothrips aztecus* sp. nov. (Figs. 1-9)

Male (macropterous). — Length 4.7-7.4 mm. (fully distended, 5.7-8.7 mm.). Color opaque black, with tip of tube paler and all knees and tarsi brown, the fore tarsal tooth yellow; fore tibiae yellow along inner and outer surfaces; fore wings lightly washed with brownish, narrowly darker along

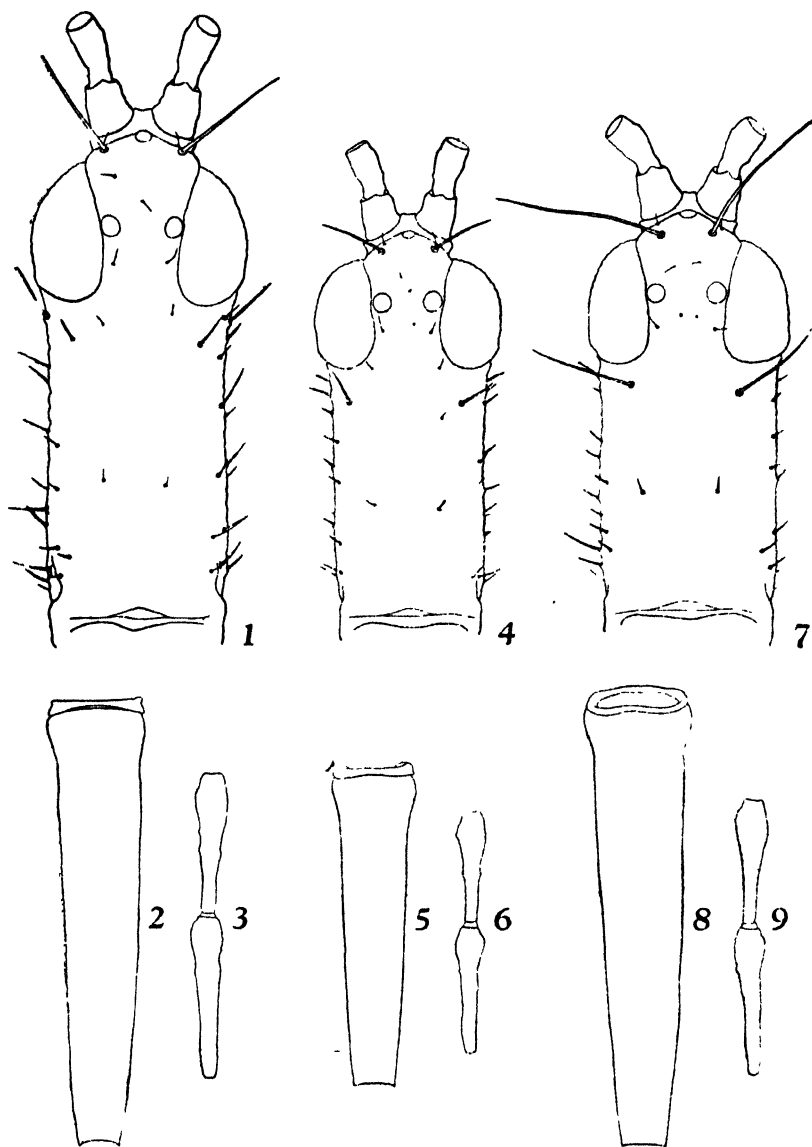
*Elaphrothrips aztecus*, sp. nov.

Fig. 1. Head, male, paratype; heterogonic maxima form. — Fig. 2. Tube; same specimen. — Fig. 3. Antennal segments III and IV; same specimen. — Fig. 4. Head, male paratype; heterogonic minima form. — Fig. 5. Tube; same specimen. — Fig. 6. Antennal segments III and IV; same specimen. — Fig. 7. Head, female, paratype. — Fig. 8. Tube; same specimen. — Fig. 9. Antennal segments III and IV; same specimen.

margins in apical half, and with two brown longitudinal vittae, the anterior one confined to basal third, the posterior one median and disappearing beyond middle of wing; antennae with segments I and II nearly black, I somewhat

paler across base, II distinctly yellowish in about apical third and along most of outer surface, III pale yellow, abruptly dark brown or blackish brown in apical third, IV, V, and VI yellow in basal one-half, two-fifths, and one-fourth, respectively, their apical portion blackish brown, VI-VIII blackish brown, nearly black; major setae on head, prothorax, and fore femora blackish brown or black, the largest ones with pale blunt tips; most abdominal setae (including the three pairs on segment IX) nearly black, the terminal ones dark at base, only, seta III on segments III-VII, II on IV-VIII and I on VIII, colorless; internal pigmentation bright red.

Head (Figs. 1 and 4) with its total median length 2.16-2.41 times the width across eyes (its slenderness varies directly as its size; that of holotype is 2.31 times as long as wide), broadest across the eyes, and only very slightly narrowed behind them, indistinctly broadened again at about basal fourth of cheeks, which are thus nearly parallel; front moderately produced beyond eyes, this cephalic process about 1.9 times as wide as long, its total length 67-80 microns (holotype 80), lateral length 28-36 (holotype 36), width at base of antennae 128-155 (holotype 147), and greatest width (at eyes) 129-166 (holotype 152); vertex slightly produced and rounded, the median ocellus slightly overhanging, not attaining frontal costa, and directed more upward than forward, the frontal costa itself shallowly concave; dorsal and lateral surfaces cross-striate in the usual manner, with strong setae arising from slight eminences, the largest pair of these (which is the lateral pair behind eyes) is about 83 microns long in holotype; postocular setae small, pointed, 33-66 microns long, reduced in size in large individuals, about 50 microns from nearest facet of eyes, their interval 162-189 microns; interocellars (107-179 microns) always very much longer than postoculars and 73-109 apart; occipital setae slender, minute, arising about midway between postoculars and base of head. Eyes about one-fourth the length of head, rounded and strongly protruding, slightly flattened posteriorly, longer and somewhat produced dorsally. Ocelli normal; posterior ones 33-34 microns in diameter, 47-62 apart, and 86-114 from median ocellus. Antennae (Figs. 3 and 6) normal; sense-cones slender and pointed, disposed as follows on the inner (and outer) surfaces of segments: III 1 (1), IV 2 (2), V 1 ( $1^{+}$ ), VI 1 ( $0^{+}$ ), VII 1 dorsal. Mouth-conc relatively

short, semicircularly rounded at apex, its extent beyond posterior dorsal margin of head 172-189 microns.

Prothorax with median line of pronotum 0.42-0.48 that of head and contained in the trans-coxal width somewhat less than twice, its dorsal surface more or less distinctly subreticulate throughout; median apodeme extending posteriorly to the line of the postero-marginal setae; major setae all present, the antero-marginals and antero-angulars minute (29-36 microns) and slender, midlaterals 53-60, the others large and with pale rounded tips, epimerals 103-169, postero-marginals 72-118, coxals 105-186. Pterothorax normal. Fore wings of holotype 2.22 mm. long, 137 microns broad at middle, and 168 microns across broadest part near apex, with 37-39 accessory setae, and with the subbasal setae respectively 124, 133, and 237 microns. Legs normal; fore femora never with a strong hooked seta at tip; fore tibiae with a distinct protuberance on inner surface near apex; fore tarsi with a strong tooth which is always longer than the width of the tarsus.

Abdomen broadest at segment II, where it is about equal in width to the prothorax across coxae and distinctly narrower than the broadest part of pterothorax, sculptured as usual in the genus; terminal setae about 406 microns long in holotype; segment IX with the three major pairs of setae respectively 378-382, 392-458, and 392-406 microns. Tube (segment X, only; Figs 2 and 5) long and slender, about 0.8 the length of head, somewhat swollen near base, and tapering roundly to apex, its length 3.8-4.6 times its greatest width near base, this 2.0-2.2 times the apical width.

Measurements of males<sup>13</sup> (topotypic paratypes, caustic-treated), in mm.: Length 7.4 (4.7), fully distended 8.7 (5.7); head, total length 0.766 (0.606), width across eyes 0.318 (0.276), greatest width across cheeks at posterior angles of eyes 0.290 (0.237), least width shortly behind eyes 0.258 (0.218), greatest width across cheeks at about basal fourth 0.265 (0.221), least width near base 0.249 (0.204), width across basal collar 0.262 (0.210); prothorax, median length

<sup>13</sup>) The measurements are of two specimens, the larger of which represents the extreme heterogonic maxima form and the smaller the extreme heterogonic minima form. The dimensions of this latter, smaller specimen are given in parentheses.

of pronotum 0.372 (0.256), width (inclusive of coxae) 0.679 (0.504); mesothorax, width across anterior angles 0.759 (0.528); abdomen, greatest width (at segment II) 0.699 (0.489); segment VII, length 0.630 (0.370), VIII 0.574 (356), IX 0.335 (0.237); tube (segment X, only), length 0.658 (0.476), greatest subbasal width 0.141 (0.125), least apical width 0.064 (0.064).

Antennal segments.	1	2	3	4	5	6	7	8
Length (microns):	96 (76)	100 (84)	235 (187)	208 (166)	180 (149)	161 <sup>15</sup> (132 <sup>15</sup> )	90 (80)	80 (77)
Width (microns):	74 <sup>14</sup> (61 <sup>14</sup> )	49 (44)	47 (45)	45 (43)	40 (38)	32 (32)	29 (27)	20 (17)
Total length of antenna, 1.150 (0.951) mm.								

**Female** (macropterous). — Color as in male, except that the fore tibiae are darker; head (Fig. 7) less slender than in the larger males, 2.1-2.2 times as long as the width across eyes; cephalic process with its breadth at base of antennae about twice its extent in front of eyes; fore femora with a low roughened tubercle at apical third of inner ventral surface; fore tibiae narrowed apically, i. e., without protuberance on inner apical surface; fore tarsi without tooth; tube (Fig. 8) much longer than in male (as is usual in this genus), the length of segment X alone nearly 1.1 times that of head; most setae longer than in male (see measurements below).

**Measurements of females**<sup>16</sup>, in mm.: Length about 5.0 (5.1), fully distended 6.2 (6.2); head, total length 0.637 (0.624), width across eyes 0.287 (0.297), greatest width across cheeks at posterior angles of eyes 0.249 (0.273), least width shortly behind eyes 0.245 (0.256), greatest width across cheeks (at about basal fourth) 0.251 (0.259), least width near base 0.237 (0.238), width across basal collar 0.248 (0.248), length of cephalic process 0.073 (0.070), lateral length 0.030 (0.030), width at base of antennae 0.142 (0.142), width at anterior margin of eyes 0.158 (0.155); eyes, dorsal length (0.185), dorsal width (0.096), dorsal interval (0.105); posterior ocelli, diameter (0.033), interval (0.063), distance from median ocellus (0.101); postocular setae, length (0.156-0.160), interval (0.160),

<sup>14</sup>) Basal width.

<sup>15</sup>) Length to tip of ventral prolongation.

<sup>16</sup>) Here the measurements of the topotypic allotype are ordinarily given first, while those of a topotypic paratype (which has been treated with caustic) are given in parentheses.

distance from eyes (0.039); interocellar setae, length (0.255), interval (0.068); mouth-cone, length beyond posterior dorsal margin of head (0.213); prothorax, median length of pronotum 0.295 (0.298), greatest width (inclusive of coxae) 0.598 (0.585); antero-marginal setae 0.030 (0.031), antero-angulars (0.040), midlaterals (0.078), epimerals 0.182 (0.204), postero-marginals 0.225 (0.224), coxals 0.118 (0.125); pterothorax, width across anterior angles 0.678 (0.666), greatest width 0.703 (0.713); fore wings, length 2.17, width at middle 0.126, greatest width near apex 0.161, subbasal setae respectively 0.123 (0.114), 0.153 (0.134), and 0.256 (0.277); abdomen, greatest width (at segment II) 0.725 (0.735); segment VII, length 0.344 (0.342), VIII 0.266 (0.272), IX 0.223 (0.220); tube (segment X, only), length 0.654 (0.658), greatest subbasal width 0.171 (0.158), least apical width 0.076 (0.067); seta I on segment IX 0.526 (0.546), II 0.571, III (0.441); terminal setae 0.414.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	—	93	206	182	162	137 <sup>18</sup>	89	88
	(83)	(93)	(215)	(182)	(155)	(128 <sup>18</sup> )	(86)	(92)
Width (microns):	67 <sup>17</sup>	48	46	49	44	33	27	18
	(69 <sup>17</sup> )	(47)	(47)	(45)	(43)	(34)	(30)	(19)
Total length of antenna, (1.034) mm.								

MEXICO: Tamazunchale (San Luis Potosi), April 30, 1939, J. D. H., 17 ♂♂ and 8 ♀♀, from dead branches.

From *foveicollis* -- which, to judge from the largely inadequate descriptions in this genus, seems to be the only other Neotropical species of comparable size with the cephalic process short, the setae on the ninth abdominal segment dark in color and shorter than the tube, and the tube itself more than seven-tenths the length of the head — *artecus* apparently differs most significantly in having the fourth and fifth antennal segments together about 1.6 times the length of the third, rather than equal in length to it.

#### 48. *Elaphrothrips defectus*, sp. nov.

Male (macropterous). — Length about 5.7 mm. (partially distended, 6.2 mm.). Color opaque black, with apical portion of tube paler, and all trochanters, bases of tibiae, and tarsi, brown, the fore tarsal tooth nearly yellow; fore wings lightly

<sup>17</sup>) Basal width.

<sup>18</sup>) Length to tip of ventral prolongation.



washed with brownish, and with two brown longitudinal vittae, the anterior one confined to basal fourth, the posterior one median and disappearing before middle of wing, the membrane between them light brown; antennae with segments I and II nearly black, I somewhat paler across base, II paler and brownish in about apical half, III pale yellow, abruptly blackish brown in apical fifth, IV blackish brown at extreme base and in apical half, its intervening portion brown, V-VIII blackish brown, nearly black, V dark brown subbasally; major setae on head, prothorax, and fore femora blackish brown or black, with pale tips; most abdominal setae colorless, the three pairs on segment IX nearly black, the terminal ones dark at base, only; internal pigmentation bright red.

Head with its total median length 2.4-2.5 times the width across eyes, where it is broadest, much narrower behind them, and distinctly widened again at about basal fifth of cheeks; front strongly produced beyond eyes, this cephalic process only 1.7 times as wide as long, its total length (in holotype) 94 microns, lateral length beyond eyes 44 microns, width at base of antennae 159, and greatest width (at eyes) 162; vertex rounded, scarcely produced, the median ocellus not overhanging, not attaining frontal costa, and directed more upward than forward, the frontal costa itself not at all, or only slightly, concave; dorsal and lateral surfaces cross-striate in the usual manner, with strong setae arising from slight eminences, the largest pairs of these setae (which are the lateral pair behind eyes and a pair at basal fifth of cheeks) 60-73 microns long in holotype; postocular setae wanting (probably represented by a vestigial pair about 10 microns long, only); interocellars of paratype 270 microns long and 79 microns apart, with pale pointed tips; occipital setae vestigial, about equal to postoculars. Eyes about one-fourth the length of head, rounded and very strongly protruding, only slightly flattened posteriorly, longer and somewhat produced dorsally, measuring as follows (in microns) in holotype: dorsal length 210, dorsal width 111, dorsal interval 106, ventral length 182, ventral width 124, ventral interval 81. Ocelli normal; posterior ones about 36 microns in diameter, 60 microns apart, and 119 from median ocellus. Antennae normal; sense-cones slender and pointed, disposed as follows on the inner (and outer) surfaces of segments: III 1 (1), IV

2 (2). V 1 ( $1^{+1}$ ), VI 1 ( $0^{+1}$ ), VII 1 dorsally. Mouth-cone relatively short, semicircularly rounded at apex, its extent beyond posterior dorsal margin of head 188 microns.

Prothorax with median line of pronotum about 0.42 that of head and contained in the trans-coxal width somewhat less than twice, its dorsal surface not heavily sculptured; median apodeme extending posteriorly to the line of the postero-marginal setae; major setae all present, the antero-marginals, antero-angulars, and midlaterals minute (19-23 microns) and slender, the others large and with pale rounded tips, epimerals 136, postero-marginals 76, coxals 105. Pterothorax normal. Fore wing of paratype 2.55 mm. long, 193 microns wide at middle, and 207 microns across broadest part near apex, with 52-53 accessory setae; holotype with the subbasal setae respectively 99, 100, and 196 microns long. Legs normal; fore femora without the strong hooked seta found at tip in some species; fore tibiae with a distinct protuberance on inner surface near apex; fore tarsi with a strong tooth which is somewhat shorter than the width of the tarsus.

Abdomen broadest at segment II, where it is about equal in width to the prothorax across coxae and distinctly narrower than the broadest part of pterothorax, sculptured as usual in the genus; terminal setae about 468 microns long in holotype; segment IX of paratype with the three major pairs of setae respectively 546, 574, and 504 microns long. Tube (segment X, only) long and slender, about 0.7 the length of head, somewhat swollen near base, and tapering evenly to apex, its length 4.2 times its greatest width near base, this twice the apical width.

Measurements of male (holotype, caustic-treated), in mm.: Length 5.74 (partially distended, 6.20); head, total length 0.829, width across eyes 0.328, greatest width across cheeks at posterior angles of eyes 0.284, least width shortly behind eyes 0.232, greatest width across cheeks (at about basal fifth) 0.259, least width near base 0.242, width across basal collar 0.258; prothorax, median length of pronotum 0.351, width (exclusive of coxae) 0.476, inclusive of coxae approximately 0.630; mesothorax, width across anterior angles 0.711; abdomen, greatest width (at segment II) 0.615; segment VII, median dorsal length 0.546, VIII 0.518, IX 0.290;

tube (segment X, only), length 0.584, greatest subbasal width 0.139, least apical width 0.068.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	103	108	379	216	187	174 <sup>19</sup>	95	92
Width (microns):	76	50	46	50	46	34	32	20
Total length of antenna, 1.354 mm.								

Female (macropterous). — Color as in male; cephalic process with its breadth at base of antennae about 1.6 times its extent in front of eyes; postocular setae wanting; fore femora without tubercle on inner surface near apex; fore tibiae without a protuberance on inner apical surface; fore tarsi without tooth; tube much longer than in male (as is usual in this genus), the length of segment X alone nearly 0.9 that of head; most setae longer than in male (see measurements below).

Measurements of female (allotype, caustic-treated), in mm.: Length about 6.9 (fully distended, 8.32); head, total length 0.854, width across eyes 0.342, greatest width across cheeks at posterior angles of eyes 0.294, least width shortly behind eyes 0.239, greatest width across cheeks (at about basal fifth) 0.286, least width near base 0.266, width across basal collar 0.280, length of cephalic process 0.113, lateral length 0.060, width at base of antennae 0.174, width at anterior margin of eyes 0.179; eyes, dorsal length 0.210, dorsal width 0.113, dorsal interval 0.117, ventral length 0.181, ventral width 0.128, ventral interval 0.087; posterior ocelli, diameter 0.037, interval 0.066, distance from median ocellus 0.132; interocellar setae, length 0.350, interval 0.083; anterior genal setae, length 0.035; mouth-cone, length beyond posterior dorsal margin of head 0.245; prothorax, median length of pronotum 0.406, greatest width (inclusive of coxae) 0.748; antero-marginal setae 0.029, antero-angulars 0.026, midlaterals 0.030, epimerals 0.210, postero-marginals 0.110, coxals 0.143; pterothorax, width across anterior angles 0.868; abdomen, greatest width (at segment II) 0.874; segment VII, median dorsal length 0.504, VIII 0.391, IX 0.276; (segment X, only), length 0.753, greatest subbasal width 0.204, least apical width 0.084; seta II on segment IX 0.788, III 0.626.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	112	117	420	239	201	177 <sup>20</sup>	98	91

<sup>19</sup>) Length to tip of ventral prolongation.

Width (microns):    84   54   50   57   49   38   33   21  
Total length of antenna, 1.455 mm.

PERU: Rioja (Rio Negro), Dept. San Martin, November 16-22, 1936, Felix Woytkowski, 1 ♂ and 1 ♀ (holotype and allotype, respectively), from dead branches and leaves, ca. 900 m. elev. [Hood No. 1152]. Vicinity of Sani Beni, Dept. Junin, July 29-August 10, 1935, Felix Woytkowski, 1 ♂ and 1 ♀, on dry branches with dry leaves, 8.40 m. elev. [Hood No. 1121].

This species is unusual in lacking postocular setae in both the male and female. It is strongly suggestive of *propinquus*, described from Venezuela, of which only the male type is known. However, that species would appear to be much larger, for its length is said to be more than 9 mm. Also, to judge from Bagnall's figure, the setae on the ninth abdominal segment are clearly shorter in *propinquus*, and the fourth, fifth, and sixth antennal segments are yellow at their base.

49. *Elaphrothrips acanthomerus*, sp. nov.

Male (macropterous). — Length about 5.8 mm. (fully distended, 7.0 mm.). Color opaque black, with apical portion of tube paler, and all trochanters, bases of tibiae, and tarsi, brown, the fore tarsal tooth yellowish brown; fore wings lightly washed with brownish, and with two brown longitudinal vittae, the anterior one tapering out beyond basal fourth, the posterior one median and disappearing beyond middle of wing, the membrane between them not darkened; antennae with segments I and II nearly black, I somewhat paler across base, II paler and brownish in about apical half, III pale yellow, abruptly blackish brown in apical fourth, IV-VIII opaque black, except basal half of IV, which is dark blackish brown; major setae on head and prothorax blackish brown or black, with pale tips; most abdominal setae colorless, the three pairs on segment IX and the terminal ones dark at base, only; internal pigmentation bright red.

Head of holotype with its total median length 2.2 times the width across eyes, where it is broadest, much narrower behind them, and distinctly widened again at about basal fourth of cheeks; front strongly produced beyond eyes, this cephalic process only 1.8 times as wide as long, its total

<sup>20)</sup> Length to tip of ventral prolongation.

length (in holotype) 99 microns, lateral length beyond eyes 46 microns, width at base of antennae 171, and greatest width (at eyes) 179; vertex rounded, not produced, the median ocellus not overhanging, not attaining frontal costa, and directed more upward than forward, the frontal costa itself slightly concave; dorsal and lateral surfaces cross-striate in the usual manner, with strong setae arising from slight eminences, the largest pairs of these setae (which are the lateral pair behind eyes and a pair at basal fifth of cheeks) 78-83 microns long in holotype; postocular setae present, with distinctly dilated tips, those of holotype 171 microns long, 175 apart, and 40 from eyes; interocellars also dilated apically, 165 microns long and 117 apart; occipital setae about 44 microns. Eyes about one-fourth the length of head, rounded and very strongly protruding, scarcely flattened posteriorly, longer and somewhat produced dorsally, measuring as follows (in microns) in holotype: dorsal length 186, dorsal width 111, dorsal interval 104, ventral length 171, ventral width 118, ventral interval 90. Ocelli normal; posterior ones about 35 microns in diameter, 55 microns apart, and 100 from median ocellus. Antennae normal, except that two pairs of dorso-lateral setae on segment III are somewhat enlarged, dark, with pale rounded tips, and distinctly outstanding, the first pair arising just beyond middle of segment, the other pair subapical; sense-cones slender and pointed, disposed as follows on the inner (and outer) surfaces of segments: III 1 (1), IV 2 (2), V 1 ( $1^{+1}$ ), VI 1 ( $0^{+1}$ ), VII 1 dorsally. Mouth-cone relatively short, semicircularly rounded at apex, its extent beyond posterior dorsal margin of head 210 microns.

Prothorax with median line of pronotum about 0.45 that of head and contained in the trans-coxal width somewhat more than twice, its dorsal surface only lightly sculptured; median apodeme extending posteriorly to the line of the postero-marginal setae; major setae all present, the antero-marginals and antero-angulars minute (55-60 microns) and slender, the others large and with pale rounded tips, mid-laterals 93, epimerals 178, postero-marginals 100, coxals 113. Pterothorax normal. Fore wings of one paratype 2.54 mm. long, 200 microns wide at middle, and 231 microns across broadest part near apex, with 48-52 accessory setae; holotype with the subbasal setae respectively 82, 82, and 129 microns long. Legs normal, except that the fore femora

(which lack the strong hooked seta found at tip in some species) have a distinct tooth at apical fourth of inner, lower surface, this tooth varying inversely as the size of the femur; fore tibiae with a distinct protuberance on inner surface near apex; fore tarsi with a strong curved tooth which is usually longer than the width of the tarsus.

Abdomen broadest at segment II, where it is invariably narrower than the prothorax across coxae and the broadest part of pterothorax, sculptured as usual in the genus; terminal setae about 518 microns long; segment IX of one large paratype with seta I 665 microns long; II 644. Tube (segment X, only) long and slender, about 0.75 the length of head, broadest, but scarcely swollen, near base, and tapering perfectly evenly to apex, its length only 3.3 times its greatest width near base, this 2.2 times the apical width.

Measurements of male (holotype, caustic-treated), in mm.: Length 5.75 (fully distended, 6.96); head, total length 0.717, width across eyes 0.325, greatest width across cheeks at posterior angles of eyes 0.286, least width shortly behind eyes 0.235, greatest width across cheeks (at about basal fourth) 0.270, least width near base 0.256, width across basal collar 0.277; prothorax, median length of pronotum 0.326, width (inclusive of coxae) 0.720; mesothorax, width across anterior angles 0.744; abdomen, greatest width (at segment II) 0.672; segment VII, median dorsal length 0.440, VIII 0.434, IX 0.297; tube (segment X, only), length 0.532, greatest subbasal width 0.163, least apical width 0.074.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	103	108	270	202	170	159 <sup>21</sup>	89	89
Width (microns):	78	53	53	51	50	41	34	22
Total length of antenna, 1.190 mm.								

Female (macropterous). — Color as in male; cephalic process with its breadth at base of antennae about 1.9 times its extent in front of eyes; postocular setae as in male, but larger; fore femora with a stout, thumb-like tooth on inner surface at apical third; fore tibiae without a protuberance on inner apical surface; fore tarsi without tooth; tube longer than in male (as is usual in this genus), the length of segment X along about 0.86 that of head; most setae longer than in male (see measurements below).

<sup>21</sup>) Length to tip of ventral prolongation.

Measurements of female (allotype, caustic-treated), in mm.: Length about 5.7 (fully distended, 6.95); head, total length 0.700, width across eyes 0.342, greatest width across cheeks at posterior angles of eyes 0.307, least width shortly behind eyes 0.265, greatest width across cheeks (at about basal fourth) 0.307, least width near base 0.290, width across basal collar 0.305, length of cephalic process 0.099, lateral length 0.050, width at base of antennae 0.178, width at anterior margin of eyes 0.188; eyes, dorsal length 0.188, dorsal width 0.116, dorsal interval 0.110, ventral length 0.189, ventral width 0.121, ventral interval 0.100; posterior ocelli, diameter 0.038, interval 0.059, distance from median ocellus 0.093; inter-ocellar setae, length 0.218, interval 0.105; anterior genal setae, length 0.049; mouth-cone, length beyond posterior dorsal margin of head 0.256; prothorax, median length of pronotum 0.307, greatest width (inclusive of coxae) 0.769; antero-marginal setae 0.063, antero-angulars 0.040, midlaterals 0.050, epimerals 0.259, postero-marginals 0.266, coxals 0.140; pterothorax, width across anterior angles 0.809; abdomen, greatest width (at segment II) 0.860; segment VII, median dorsal length 0.399, VIII 0.328, IX 0.225; tube (segment X, only), length 0.605, greatest subbasal width 0.204, least apical width 0.077; seta I on segment IX 0.672, II 0.777, III 0.658.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	110	105	283	197	166	157 <sup>22</sup>	94	96
Width (microns):	80	55	55	56	53	40	35	22
Total length of antenna, 1.208 mm.								

PERU: Rioja, Dept. San Martin, Sep. 13 -- Nov. 30, 1936, Felix Woytkowski, 6 ♂♂ and 5 ♀♀. — Moyobamba, Dept. San Martin, Dec. 6, 1936, Felix Woytkowski, 1 ♀. — San Pedro (region of Satipo), Dept. Junin, May 3-29, 1935, Felix Woytkowski, 2 ♀♀. All specimens were taken on dry branches, tree trunks, and leaves.

At first glance, it would seem that this species should be easily recognizable, for no other has the fore femora toothed; and it is indeed remarkable that such a tooth should be present in the male. Yet there are before me more than forty other specimens, mostly collected with the types, which lack the tooth, but are otherwise similar.

<sup>22</sup>) Length to tip of ventral prolongation.

50. *Actinothrips polychaetus*, sp. nov. (Fig. 10)

Male (macropterous). — Length about 7.3 mm. (distended, 8.0 mm.). Color very dark, the head and thorax blackish brown, the abdomen opaque coal-black (after maceration in caustic, the abdomen beyond segment II remains opaque black, excepting the apex of the tube, which is brown); legs nearly black, with all knees and tarsi dark brown; wings of both pairs with a heavy, nearly black, median vein extending to

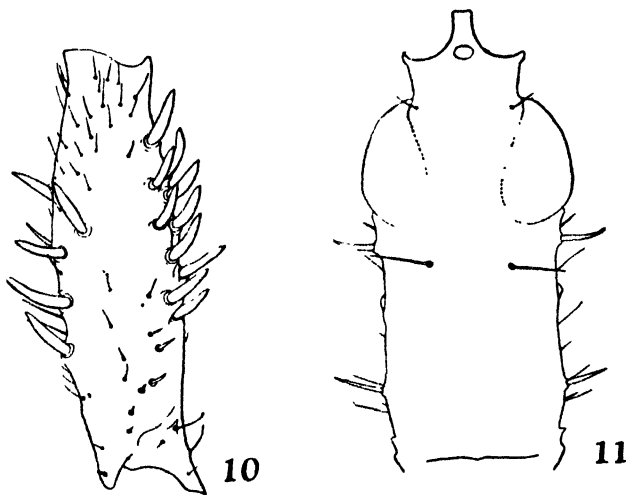


Fig. 10. *Actinothrips polychaetus*, sp. nov. Left fore femur, dorsal aspect; male, holotype. — Fig. 11. *Zactinothrips modestus*, sp. nov. Head, dorsal aspect; male, holotype. (Many details omitted because of opacity of specimen.)

near tip and with nearly black fringing hairs, membrane of fore wings light brown, paler near apex and in front of median vein, the anterior margin narrowly darkened; antennae with segments I, II, VII and VIII nearly concolorous with head, III-V largely pale brownish yellow, III blackish brown at base, paling to nearly yellow at basal two-fifths, and somewhat darkened with brown in the swollen apical portion, IV very narrowly blackish brown at extreme base, clouded brownish yellow beyond, its apical portion somewhat darker than that of III, V with its apical two-fifths abruptly dark blackish brown, but otherwise like IV, VI darker than V, dark blackish brown in apical half and at extreme base, the intervening portion dark brown.

Head about 2.15 times as long as greatest width (which is across eyes) and about 2.32 times as long as median line of pronotum, its form and chaetotaxy normal; produced portion in front of eyes nearly parallel-sided in the narrower basal



part; cheeks narrowed shortly behind eyes and again near base, each with two very stout, prominent, dark setae, 80-85 microns long, arising from distinct tubercles, one pair just behind eyes, the other one-third the length of cheeks from base; surface closely and lightly transversely striate; post-ocular setae 104 microns long, their bases 110 microns apart and 43 microns from nearest facets of eyes; two pairs of postocellar setae present, scarcely equal in length to diameter of posterior ocelli, a trifle stouter and shorter than the two inter-ocellar pairs, but shorter than a more prominent pair at the anterior angles of eyes. Eyes about 0.27 as long as head, measuring as follows, in microns, in the caustic-treated holotype: dorsal length 199, dorsal width 108, dorsal interval 130, ventral length 172, ventral width 114, ventral interval 118. Ocelli normal; posterior pair with their hind margin somewhat behind center of eyes, their diameter about 35 microns, interval 59, distance from median ocellus 117, the latter smaller and with its hind margin distinctly behind the insertion of antennae. Antennae typical, long and slender, fully three times the length of head; sense-cones long and slender, nearly indistinguishable from setae, disposed as follows on the inner (and outer) surfaces of the segments: III 1 (1), IV 1 (2) - 1 ventral, V 1 ( $1^{+1}$ ), VI 1 ( $0^{+1}$ ), VII 1 dorsal. Mouth-cone normal, semicircularly rounded at tip, extending 244 microns beyond posterior dorsal margin of head.

Prothorax 2.3 times as broad across coxae as median length of pronotum, with a short median apodeme in front of middle, its surface smooth; antero-marginal setae slender, pointed, about 37 microns long; antero-angulars and the two posterior pairs large, dark brown, with pale slightly dilated tips, the antero-angulars 144 microns, epimerals 150, postero-marginals 122, all borne on distinct tubercles; midlaterals smaller, nearly or quite pointed, 60 microns long; coxae without strong setae. Fore legs long and slender (as is usual in the genus). the fore femora (Fig. 10) remarkable in possessing 10-11 very strong setae along inner surface and 5-6 on outer surface, these setae finger-shaped and curved, but with pointed tips, all arising from low tubercles; fore tibiae without strong setae; fore tarsi unarmed. Wings of nearly equal width throughout, the fore pair 3.28 mm. long, 270 microns wide at middle, and 283 microns wide subapically, where they are broadest, with 52-54 accessory setae, the sub-

basal setae respectively 86, 85, and 120 microns long. Metathorax with the usual pair of large dark setae, these 238 microns long, 165 apart, and arising from low tubercles.

Abdomen normal, long, slender, and straightly tapering; setae moderately long, most of them curved and pointed, the three lowermost pairs on both VII and VIII (as well as the lateral pair on the preceding segments) stout and rounded at tip, those on VII respectively 175, 138, and 124 microns long and 16-18 in diameter, those on VIII shorter, subequal, less than 110 microns long, and 16-17 in diameter; setae on IX pointed, dark brown, paler apically, I 336 microns, II 350, III 336. Tube (segment X, only) about 1.83 times the length of head, sides nearly straight, covered with a number of slender, nearly black setae which are shorter than the greatest width of tube.

Measurements of male (holotype, caustic-treated), in mm.: Length about 7.31 (fully distended, 8.02); head, total length 0.745, width across eyes 0.346, greatest width at posterior angles of eyes 305, least width shortly behind eyes 0.276, greatest width across cheeks (inclusive of tubercles) 0.305, least width near base 0.273, width across basal collar 0.286; prothorax, median length of pronotum 0.321, width (inclusive of coxae) 0.742; pterothorax, width across anterior angles 0.836, greatest width 0.990; abdomen, greatest width (at segment II) 0.924; tube (segment X, only), length 1.36, greatest subbasal width 0.162, least apical width 0.102.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	133	117	762	435	396	242	134	133
Width (microns):	103	64 <sup>23</sup>	57	54	49	44	37	30
Total length of antenna, 2.35 mm.								

VENEZUELA: Akuriman, Estados Bolivar, November 1940, Dr. Pablo A. Anduze, 1 ♂.

This species, like the others of its genus, feeds upon fungus spores. The fore femoral armature is thoroughly distinctive.

# 51. *Anactinothrips marginipennis*, sp. nov.

Female (macropterous). — Length about 6.0 mm. (fully distended, 7.2 mm.). Color of body and legs (including tarsi) nearly black; wings nearly colorless, the fore pair abruptly

<sup>23</sup>) Greatest subbasal width; greatest width near middle is 52 microns.

dark brown in anal area and, in the fringed portion, with a marginal brown line whose width is the depth of insertion of the fringing hairs into the membrane of the wing, the wing membrane along outer half of anal fold narrowly margined with brown; antennae with segments I and II nearly black, III yellow, shaded or mottled with gray or brown to the first whorl of setae and at apex beyond the second whorl, IV narrowly almost black at base, brown beyond, darkened just before the first whorl of setae and narrowly yellowish just beyond it, V dark brown to first whorl of setae (slightly paler subbasally) and light brown beyond, narrowly paler just beyond middle, VI-VIII dark brown, VI obscurely paler at middle; all major setae black, with pale tips; internal pigmentation bright red.

Head slender, about 2.54 times as long as greatest width (which is across cheeks at their basal fourth), its form thoroughly typical, sides slightly flaring to eyes, narrowest just behind them, smoothly broadened to basal fourth of cheeks; vertex distinctly elevated above eyes, its anterior surface nearly vertical, the median ocellus directed forward; front distinctly prolonged in front of eyes, its sides strongly concave, its length in holotype 113 microns, greatest width at base of antennae 178, least width 154, lateral length 67; interocellar, postocular, and occipital setae long, the first of these slightly stouter, about 16 microns in diameter near base, tapering less rapidly, and with their tips rounded, the others with their tips extremely slender and pointed; interocellars 175 microns long and 69 apart, postoculars 378 long, 76 apart, and 63 from eyes, occipitals 546 long, 94 apart, and 235 behind postoculars (in holotype); genal setae comprising two stout pairs behind eyes (the upper, longer pair 93 microns) and about four smaller pairs on the swollen basal portion, only. Eyes typical, distinctly protruding, their dorsal length contained in that of head more than five times, their inner margins almost straight and strongly converging posteriorly, the eyes themselves measuring as follows in microns in holotype: dorsal length 175, greatest dorsal width 100, least dorsal interval 119. Ocelli small, those of posterior pair about 29 microns in diameter, 90 apart, and 71 from median ocellus, the latter with its anterior margin fully 15 microns in advance of that of eyes. Antennae typical in form and structure, segments V and VI each with the usual

ventral prolongation, VII with a ventral subapical ridge; III about 588 microns long, fully five times as long as I and less than twice the length of V; sense-cones short (that on outer surfaces of III about 36 microns long), disposed as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2) + 1 ventral, V 1 (1), VI 1 ( $0^{+1}$ ), VII 1 dorsal. Mouth-cone normal, extending about 350 microns beyond posterior dorsal margin of head in holotype.

Prothorax with median line of pronotum about one-fourth the length of head and contained in the trans-coxal width about 2.9 times; pronotum with front and hind margins nearly concentric, its surface nearly smooth, but with a few delicate cross-striate along anterior margin and between postero-marginal setae; antero-marginal setae slenderer than the others and about 17 microns long, antero-angulars stronger and heavier though only about 30 microns, midlaterals 58, epimerals 77, postero-marginals 311, coxals 34 (in holotype). Legs typical, fore femora with a subapical whorl of four setae and three similar ones near apical two-fifths, the uppermost of these last much the largest; fore tarsi unarmed. Fore wings typical, in holotype 2.44 mm. long, 190 microns wide at middle, and 224 microns subapically, with 56 accessory hairs, the subbasal setae respectively 37, 39, and 103 microns long. Metanotum with the usual pair of large setae 270 microns apart.

Abdomen broad and heavy, thoroughly typical; setae very long and conspicuous, particularly those on the distal segments; terminal setae 434 microns in holotype. Tube (segment X, only) about 0.97 as long as head (in holotype) and about 5.4 times as long as greatest subbasal width, which is about 1.7 times the apical width.

Measurements of female (holotype), in mm.: Length about 5.96 (fully distended, 7.18); head, total length 0.952, width across eyes 0.318, least width shortly behind eyes 0.277, greatest width across cheeks (at about their basal fourth) 0.375, least width near base 0.346, width across basal collar 0.357; prothorax, median length of pronotum 0.242, width (inclusive of coxae) 0.700; pterothorax, greatest width 0.904; abdomen, greatest width (at segment III) 1.24; tube (segment X, only), length 0.923, greatest subbasal width 0.169, least apical width 0.097.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	105	106	588	396	301	182	124	111
Width (microns):	82	51	59	58	50	43	38	29
Total length of antenna, 1.913 mm.								

Male (macropterous). — Identical with female in color and not differing markedly in structure, save for the swollen fore femora and large, straight, slender tarsal teeth in heterogonic maxima forms; tube at least 0.9 the length of head and fully 5.6 times as long as greatest subbasal width, this 1.7-1.9 times the apical width.

Measurements of males,<sup>21</sup> in mm.: Length about (5.60), fully distended, (6.47); head, total length 0.900 (0.902), width across eyes 0.311 (0.307), least width shortly behind eyes 0.267 (0.266), greatest width across cheeks (at about basal fourth) 0.337 (0.337), least width near base 0.316 (0.311), width across basal collar 0.325 (0.321), cephalic process, length 0.113 (0.113), greatest width 0.172 (0.174), least width 0.150 (0.147); eyes, dorsal length (0.171), dorsal width (0.094), least dorsal interval (0.120); posterior ocelli, diameter (0.031), interval (0.088), distance from median ocellus (0.070); postocular setae, length 0.420 (0.406), interval (0.074), distance from eyes (0.050); occipital setae, length 0.448 (0.560), interval (0.092), distance from postoculars (0.252); interocellar setae, length (0.196), interval (0.070); mouth-cone, length beyond posterior dorsal margin of head (0.322); prothorax, median length of pronotum 0.272, (0.276), greatest width (inclusive of coxae) 0.661 (0.679); antero-marginal setae, length (0.032), antero-angulars (0.040), midlaterals (0.036), epimerals (0.143), postero-marginals 0.318 (0.392), coxals pterothorax, greatest width (0.903); abdomen, greatest width (at segment III) (0.965); tube (segment X, only), length 0.826 (0.826), greatest subbasal width 0.145 (0.147), least apical width 0.083 (0.077).

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	—	—	570	382	298	—	—	—
	(112)	(108)	(556)	(368)	(284)	(167)	(120)	(110)
Width (microns):	(80)	(53)	(57)	(55)	(47)	(41)	(38)	(28)
Total length of antenna, (1.965) mm.								

PERU: Rioja, Dept. San Martin, September 14, 1936, Felix Woytkowski, 1 ♀ and 2 ♂♂ (including holotype

<sup>21</sup>) Measurements given in parentheses are of a topotypic paratype, while the other measurements are of the allotype.

and allotype) [Hood No. 1136]. — Rioja (Soritor, ca. 900 m. elev.), October 19, 1936, Felix Woytkowski, 1 ♂ [Hood. No. 1150]. — San Pedro (region of Satipo), Dept. Junin, May 3-29, 1935, Felix Woytkowski, 1 ♂ [Hood No. 1127]. All specimens were taken from dry branches, tree trunks, and leaves.

This species, closely related to *mgricornis*, which was described from British Guiana, is notable for the slender, produced head, which is three times as long as the width across eyes and 3.4 times the least width behind them.

52. *Anactinothrips brachyura*, sp. nov.

Female (macropterous). — Length about 5.8 mm. (fully distended, 7.0 mm.). Color of body and legs (including tarsi) nearly black; wings nearly colorless, the fore pair dark brown in anal area and with a nearly median brown vitta which gradually disappears in apical third of wing, this vitta narrow basally but broadened in middle third of wing to occupy more than one-third of its width, the hind wings with a similar broad vitta which is post-median, paler apically, and sharply delimited along its anterior margin; antennae with segments I, II, VII, and VIII nearly black, III yellow (more intensely so basally) and shading in apical fifth to nearly black at apex, IV narrowly almost black at base, brown beyond, nearly black in apical fifth, V dark brown, somewhat paler in the slender basal portion and nearly black in apical fourth or fifth, VI dark brown in about basal half and nearly black beyond; all major setae black, with pale tips; internal pigmentation bright red.

Head about 2.2 times as long as greatest width (which is across cheeks at their basal fourth), its form thoroughly typical, sides just visibly flaring to eyes, narrowest just behind them, smoothly broadened to basal fourth of cheeks; vertex convex but not at all crested or produced; front distinctly prolonged in front of eyes, its sides nearly straight (slightly concave) and converging to eyes, its length in holotype 88 microns, greatest width at base of antennae 181, least width 165; interocellar, postocular, and occipital setae long, about equal in diameter (16-17 microns) basally, the first of these tapering less rapidly and with their tips rounded, the others with their tips pointed and extremely slender; interocellars 154 microns long and 91 apart, postoculars 462 long, 77 apart,

and 42 from eyes, occipitals 546 long, 59 apart, and 211 behind postoculars (in holotype); genal setae comprising two stout pairs behind eyes (the upper, longer pair 80 microns) and two or three smaller pairs on the swollen basal portion, only. Eyes typical but only slightly protruding, their dorsal length contained in that of head 4.7 times, their inner margins almost straight and strongly converging posteriorly, measuring as follows in microns in holotype: dorsal length 182, greatest dorsal width 108, greatest dorsal interval 190, least dorsal interval 127, ventral length 154, greatest ventral width 109, least ventral interval 125. Ocelli small, those of posterior pair 27-30 microns in diameter, 91 apart, and 56 from median ocellus, the latter not overhanging but directed largely upward and with its anterior margin about 15 microns behind that of eyes. Antennae typical in form and structure; segments V and VI each with the usual ventral prolongation, VII with a ventral subapical ridge; III about 571 microns long, about 4.5 times as long as I and 2.4 times the length of V; sense-cones short (that on outer surface of III about 30 microns long), disposed as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2) + 1 ventral, V 1 (1), VI, 1 (1), VII 1 dorsal. Mouth-cone normal, extending about 330 microns beyond posterior dorsal margin of head in holotype.

Prothorax with median line of pronotum about 0.32 as long as head and contained in the trans-coxal width about 2.75 times; pronotum with front and hind margins nearly concentric, its surface nearly smooth, but with a few delicate cross-striae in the area behind the line of postero-marginal setae; antero-marginal setae slenderer than the others and 47 microns long, antero-angulars strong and heavy though only 70 microns, midlaterals 144, epimerals 364, postero-marginals 494, coxals 78 (in holotype). Legs typical, fore femora with a subapical whorl of four blunt tipped setae and three similar ones near apical two-fifths, the uppermost of these last much the largest; fore tarsi unarmed. Fore wings typical, in one topotypic paratype 2.58 mm. long, 266 microns wide at middle, and 280 microns subapically, with 51-52 accessory hairs; holotype with the subbasal setae respectively 50, 96, and 207 microns long. Metanotum with the usual pair of large setae 441 microns long and 269 apart.

**Abdomen** broad and heavy, thoroughly typical; setae very long and conspicuous, particularly those on the distal segments; seta I on segment IX 1128 microns, terminal setae 504 (in holotype). Tube (segment X, only) about 0.86 as long as head (in holotype) and about 3.5 times as long as greatest subbasal width, which is fully 2.6 times the apical width.

**Measurements** of female (holotype, caustic-treated), in mm.: Length about 5.77 (fully distended, 7.03); head, total length 0.850, width across eyes 0.342, least width shortly behind eyes 0.323, greatest width across cheeks (at about basal fourth) 0.388, least width near base 0.346, width across basal collar 0.360, prothorax, median length of pronotum 0.273, width (inclusive of coxae) 0.752; pterothorax, greatest width 1.02; abdomen greatest width (at segment II) 1.15; tube (segment X, only), length 0.729, greatest subbasal width 0.207, least apical width 0.078.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	126	97	571	340	238	167	119	80
Width (microns):	80	56	57	62	52	45	38	25
Total length of antenna, 1.738 mm								

**Male** (macropterous). — Identical with female in color and not differing markedly in structure, save for the swollen fore femora and large tarsal teeth in heterogonic maxima forms; allotype with the fore femora 543 microns wide (1.4 times the greatest width of head) and the straight, slender tarsal tooth 190 microns long; tube nearly 0.8 the length of head and fully 3.7 times as long as greatest subbasal width, this about 2.4 times the apical width.

**Measurements** of male (allotype, caustic-treated), in mm.: Length about 5.54 (fully distended, 6.53); head, total length 0.844, width across eyes 0.335, least width shortly behind eyes 0.305, greatest width across cheeks (at about basal fourth) 0.344, least width near base 0.315, width across basal collar 0.328; cephalic process, length 0.094, greatest width 0.181, least width 0.165; eyes, dorsal length 0.186, dorsal width 0.108, least dorsal interval 0.119, greatest dorsal interval 0.181, ventral length 0.154, greatest ventral width 0.109, least ventral interval 0.118; posterior ocelli, diameter 0.028, interval 0.083, distance from median ocellus 0.052; postocular setae, length 0.354, interval 0.079, distance from eyes 0.042; occipital setae, length 0.420, interval 0.059, distance from postoculars



0.245; interocellar setae, length 0.125, interval 0.079; mouth-cone, length beyond posterior dorsal margin of head 0.294; prothorax, median length of pronotum 0.370, greatest width (inclusive of coxae) 0.784; antero-marginal setae, length 0.029, antero-angulars 0.063, midlaterals 0.126, epimerals 0.345, postero-marginals 0.448, coxals 0.055; pterothorax, greatest width 0.938; fore wings, lengths of subbasal setae 0.056, 0.098, and 0.203, respectively; abdomen, greatest width (at segment III) 0.928; tube (segment X, only), length 0.658, greatest subbasal width 0.175, least apical width 0.072; terminal setae 0.476.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	129	102	588	353	242	161	115	79
Width (microns):	84	56	61	63	53	44	37	25
Total length of antenna, 1.772 mm.								

PERU: *Pioja*, Dept. San Martin, November 25-30, 1936, Felix Woytkowski, 2 ♂ and 2 ♂♂ (including holotype and allotype) [Hood Nos. 1146 and 1154]; San Pedro (region of Satipo), Dept. Junin, May 3-29, 1935, Felix Woytkowski, 3 ♀♀, ca. 900 m. elev. [Hood No. 1127]. All specimens were taken from dry branches, tree trunks, and leaves.

As nearly as may be judged from the published descriptions, this species belongs in the near neighborhood of *longisetis*. In that species, described from British Guiana, the head and antennae are apparently much shorter, however. The relatively short tube permits its separation at once from most of the remaining species.

### 53. *Actinothrips modestus*, sp. nov. (Fig. 11)

Male (macropterous). — Length 6.0-6.3 mm. (distended, 6.6-7.2 mm.). Color nearly uniform coal-black, with posterior half of head, all of thorax, first two abdominal segments, all tarsi, articulations of legs, and tip of tube, dark blackish brown when examined under intense transmitted light; wings of both pairs with a heavy, nearly black, median vein extending to near tip and with the fringing hairs almost black, the fore pair with the membrane very lightly washed with buff and narrowly margined with pale brown, the costal margin dark brown from base to beyond the last subbasal seta, the anal area and adjoining portion of wing membrane dark brown; hind wings darkened at apex, along posterior margin, and at base; antennae with segments I, II, VII and VIII blackish brown, the intervening segments largely dull straw-colored and

more or less mottled with brown, III dark brown or even blackish brown in about basal fourth but not darkened apically, IV not darkened basally and only indistinctly clouded apically, V not darkened basally but rather heavily shaded with gray-brown apically, VI brown in basal half and blackish brown beyond, or dull straw-colored, mottled with brown, in basal half; internal pigmentation bright red.

Head (Fig. 11) 2.13-2.18 times as long as greatest width (which is across eyes) and about 2.5 times as long as median line of pronotum; front strongly produced beyond eyes, this cephalic process only 1.3-1.4 times as wide as long, its total length 125-144 microns, lateral length beyond eyes 69-84, width at base of antennae 175-183, and width shortly behind anterior margin of eyes 167-172 (the first dimension in each case is of the holotype); vertex not produced and not overhanging; cheeks with a ventro-lateral tubercle at or in advance of middle, and with the usual two pairs of stout genal setae, these 74 and 83 microns long in holotype, 78 and 90 in paratype, the posterior pair longer; postocular setae 90-124 microns long, 51-63 from eyes, and 113-136 apart, their tips (like those of the genal setae) pale and rounded. Eyes normal, about 0.3 the length of head, their dorsal length 195 microns in holotype. Ocelli normal, the posterior pair opposite middle of eyes. Antennae very long and slender, about 3.2 times the length of the long head, segment VIII 1.7-1.8 times as long as VII; segments III-V with the usual, minute, club-shaped setae (on their swollen apical portion) less numerous than in genotype; sense-cones long and slender, nearly indistinguishable from setae, disposed on the inner (and outer) surfaces of the segments as follows: III 1 (1), IV 1 (2) -|- 1 ventral, V 1 (1), VI 1 (0<sup>+</sup> 1), VII 1 dorsal. Mouth-cone broadly rounded at tip, in holotype extending 182 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum slightly less than 0.4 that of head and contained in the trans-coxal width nearly 2.3 times, its dorsal surface without sculpture, but with the usual median apodeme; antero-marginal setae 47-50 microns long; antero-angulars and midlaterals even shorter, the former not arising from tubercles; epimerals much longer and stouter, nearly black, with rounded pale tips, 86 microns long in holotype. Fore legs normal; fore femora with

three large, dark, blunt, pale-tipped setae near apex, one at about basal two-fifths of outer surface, and a larger one near middle of upper surface; fore tibiae with the usual two pointed setae on outer dorsal surface near base; fore tarsi with a strong curved tooth. Wings of both pairs narrow, the fore pair of holotype 2.99 mm. long, 154 microns wide at middle, and 182 microns wide subapically, where they are broadest, with 29-30 accessory setae (32-34 in paratype), and with the subbasal setae respectively 56, 64, and 130 microns. Metanotum with the elevated basal portion smooth and the apical portion distinctly reticulate; metanotal setae of holotype 98 microns long and 170 apart.

Abdomen normal in form and structure, narrower than pterothorax, its sides nearly straight and tapering evenly to tube; tergum I with the striae in median anterior portion heavy and only slightly curving posteriorly; setae moderately long, those on segments I, II, and IX nearly black, the others yellowish or brownish, often darkened basally. Tube very long and slender, about twice the length of head and nine or ten times as long as its own greatest basal width, this about 1.6 times the width at apex, its surface covered with slender, nearly black setae except at base and apex; terminal setae about 269 microns.

Measurements of male (holotype), in mm.: Length about 6.01 (distended, 6.61); head, total length 0.650, width across eyes 0.305, greatest width at posterior angles of eyes 0.276, least width shortly behind eyes 0.248, greatest width across cheeks (at about basal third, inclusive of tubercles) 0.269, least width near base 0.234, width across basal collar 0.251; prothorax, median length of pronotum 0.252, width (inclusive of coxae) 0.571; pterothorax, width across anterior angles 0.671, greatest width 0.743; abdomen, greatest width (at segment II) 0.682; tube segment (X, only), length 1.27, greatest subbasal width 0.130, least apical width 0.082.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	111	97	522	385	384	242	116	214
Width (microns):	87	60	58	54	48	43	39	32
Total length of antenna,	2.071 mm.							

PERU: Rioja (Minas, Rio Seco), Dept. San Martin, September 18-23, 1936, Felix Woytkowski, 1 ♂ (holotype), from «dead branches and leaves; jungle, elev. about 900 m.» [Hood No. 1135]. The paratype, also a male from

Peru, bears my number 1421, the data for which are not yet available; but at the end of this series of papers, full information will be given.

From *elegans*, the only other known species of the genus, *modestus* differs markedly in antennal coloration, the form of the head, the chaetotaxy of the head and fore femora, and the sculpture of the metanotum and first abdominal tergum.

54. *Zeugmatothrips annulipes*, sp. nov.

Female (macropterous). — Length about 3.7 mm. (distended, 3.9 mm.). Color of anterior half of head and last eight abdominal segments (even by intense transmitted light) opaque coal-black, the thorax blackish brown and paler in its membranous areas; legs brown or blackish brown, the fore pair paler than the others, all trochanters, tarsi, and extreme bases of femora brownish yellow, the fore and hind femora nearly yellow in apical fourth, fore femora heavily blackish along entire outer surface, middle femora distinctly paler (but not yellow) apically, fore tibiae yellowish, heavily overlain with brown; wings of both pairs pale yellowish brown, darker at base (especially in anal area of fore pair) and apically, the longitudinal vein brown, that of hind wings narrower; antennae with segments I, II, VII, and VIII nearly black, III yellow in extreme base of pedicel, thence blackish brown to middle or beyond, its remainder and IV-VI bright golden yellow, VI darkened apically; all major setae on head, thorax, abdomen, fore wings, and legs, yellow or yellowish and concolorous with the large seta on the first antennal segment, the single large seta on each of antennal segments III-V dark brown, as are also the clothing setae on tube and the terminal setae.

Head about 1.6 times as long as greatest width across eyes, which is equal to the width across cheeks just behind a slight postocular notch, the cheeks slightly concave in their anterior half posterior to this distinct swelling, thence convexly narrowed to basal collar, the least width of head at this narrowest point nearly 0.9 its greatest width; surface not subreticulate, but, rather, cross-striate with anastomosing lines which, in the median area between the postocular and occipital setae, are somewhat asperate; postocular setae long (164 microns in one paratype), heavy, and knobbed, situated just in advance of posterior margins of eyes, about 65 microns

apart and 19 from eyes; occipital (or dorso-cephalic) setae similar in form to postoculars, about 130 microns long, 49 apart, 94 from postoculars, and 125 from posterior margin of head, both pairs arising from low tubercles and, when observed under low magnifications, with their large pale insertions suggesting ocelli; genal setae minute, brown, pointed, and disposed in two or three pairs. Eyes about 0.3 the length of head, in one caustic-treated paratype 120 microns long, 72 wide, and 94 apart dorsally. Ocelli of posterior pair about 22 microns in diameter, 36 apart, and 50 from median ocellus, which is noticeably smaller. Antennae about 2.3 times the length of head, formed as usual in the genus; segment I with the long (140 microns) knobbed seta arising from a distinct tubercle; III-V (in holotype) respectively 135, 160, and 174 microns, each with a slightly knobbed dorsal seta arising from a conspicuous dark base and measuring respectively 145, 154, and 153 microns (in holotype); sense-cones long, slender, and pointed, disposed as follows on the inner (and outer) surfaces of the segments: III 1 (1), IV 2 (2), V 1 (1<sup>+</sup>), VI 1 (0<sup>+</sup>), VII 1 dorsal. Mouth-cone semicircularly rounded at tip, extending about 162 microns beyond posterior dorsal margin of head.

Prothorax about 0.46 the length of head and (inclusive of coxae) about 2.5 times as wide as long, its pronotum with a few indistinct reticles, its five pairs of very long, heavy, knobbed setae arising from conspicuous, nearly black tubercles, the setae of one paratype measuring as follows in microns: antero-marginals 147, antero-angulars 173, midlaterals 176, epimerals 164, postero-marginals 163; coxal setae minute, as in its congeners. Legs normal to the genus; fore femora each with four strong knobbed setae, middle and hind femora each with three, fore tibiae with one, middle and hind tibiae each with two close to base; fore tarsi unarmed. Wings of both pairs long (1.66 mm. in holotype), narrow, of nearly equal width throughout, and with the usual strong median vein extending nearly to tip; fore wings with the three large subbasal setae similar in form to the prothoracic ones and measuring, respectively, in holotype, 137, 146, and 197 microns, accessory setae of hind margin absent. Mesothorax narrower than metathorax, the latter about 561 microns wide and much swollen at sides; metanotum with anterior portion elevated and bearing a pair of prominent, stout, knobbed

setae, 192 microns long and 58 apart, the surrounding portions of metanotum subreticulate with dark lines; metepimeron with a similar seta which is about equal in length to major setae on femora.

Abdomen typical, broadest at segment III, where it is slightly narrower than the metathorax, thence tapering quite evenly to tube, the lateral setigerous tubercles on V-VII conspicuous and projecting markedly beyond the general outline; all major dorso-lateral setae similar to prothoracic ones, conspicuously knobbed, the lateral pair on V about 193 microns. Tube (segment X, only) about 2.3-2.5 times as long as head, nearly or quite seven times as long as greatest width, and 2.5-2.7 times as broad near base as at apex, its surface with numerous, dark, clothing hairs, of which the upper ones are blunt and the longest longer than the greatest width of tube; apex of tube distinctly narrowed.

Measurements of female (holotype, caustic-treated), in mm.: Length about 3.70 (distended, 3.92); head, total length 0.386, width across eyes 0.237, least width just behind eyes 0.231, greatest width across cheeks (shortly behind eyes) 0.237, least width near base 0.204, width across basal collar 0.210; prothorax, median length of pronotum 0.178, width (inclusive of coxae) 0.445; pterothorax, greatest width 0.561; abdomen, greatest width (at segment III) 0.554; tube (segment X, only), length 0.962, greatest subbasal width 0.133, least apical width 0.052; setae on abdominal segment IX, length, I 0.193, II 0.227, III 0.174.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	83	76	135	160	174	109	83	83
Width (microns):	56	41	40	43	39	35	30	24
Total length of antenna, 0.903 mm.								

Male (macropterous). — Length about 3.25 mm. (distended, 3.56 mm.). Color and structure essentially as in female, the fore tarsi unarmed.

Measurements of male (paratype, caustic-treated), in mm.: Length about 3.25 (distended, 3.56); head, total length 0.374, width across eyes 0.232, least width just behind eyes 0.221, greatest width across cheeks (shortly behind eyes) 0.224, least width near base 0.178, width across basal collar 0.186; eyes, dorsal length 0.114, dorsal width 0.071, dorsal interval 0.091; posterior ocelli, diameter 0.020, interval 0.035, distance from median ocellus 0.050; postocular setae, length

0.153, interval 0.067, distance from eyes 0.023; occipital setae, length 0.120, interval 0.038; mouth-cone, length beyond posterior dorsal margin of head 0.126; prothorax, median length of pronotum 0.161; greatest width (inclusive of coxae) 0.413; antero-marginal setae, length 0.139, antero-angulars 0.159, mid-laterals 0.153, epimerals 0.167, postero-marginals 0.152; pterothorax, greatest width 0.507; abdomen, greatest width (at segment III) 0.494; tube (segment X, only), length 0.836, greatest subbasal width 0.116, least apical width 0.049; seta I on segment IX 0.157, II 0.183.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	76	73	129	149	164	96	77	80
Width (microns):	53	39	38	42	41	36	30	23
Total length of antenna, 0.844 mm								

PERU: Piedras Grandes, Dept. Huanuco (Andes, elev. ca. 3000 m.), November 3-6, 1937, Felix Woytkowski, 3 ♀ (including holotype) and 1 ♂, from dry branches with leaves [Hood No. 1469]; also 20 ♀ and 8 ♂♂ (including allotype) taken by Mr. Woytkowski at the same locality, Nov. 6, 1937, from «flowers of a wild potato» [Hood No. 1468].

This species is of course a feeder upon fungus spores, and the specimens from flowers must have been actually living upon dead or dying parts of the plant. From the closely allied *bodiipes*, the species may readily be known by the more slender head and the coloration of the legs.

##### 55. *Dasythrips fraterculus*, sp. nov.

Male (macropterous). — Length 6.1-7.6 mm. (distended, 6.6-8.5 mm.). Color nearly uniform coal black, with only the bases of the tarsi paler, even when examined under intense transmitted light; wings of both pairs with a heavy, nearly black, median vein extending to near tip and with the fringing hairs almost black, the fore pair with the membrane very lightly washed with buff and narrowly margined with pale brown, the costal margin dark brown from base to beyond the last subbasal seta, the anal area dark brown, as is also the posterior half of wing membrane to the beginning of the median vein; hind wings darkened at base and in the entire area behind median vein; antennae with segments I, II, VII, and VIII blackish brown, I often somewhat paler across base and II at apex, III dark brown or even blackish

brown basally, pale brown to the first whorl of setae and dark blackish brown beyond the second whorl, the short intervening portion yellow, IV and V similar in coloration to III but darker, with a brief, nearly black ring at base, with the subapical pale area progressively darker, and the dark apical area progressively longer, VI brown in basal half and blackish brown beyond; internal pigmentation bright red.

Head about 2.1 times as long as greatest width (which is across eyes) and about 2.1 times as long as median line of pronotum; front distinctly produced beyond eyes, this cephalic process about 1.8 times as wide as long, its total length 111 microns, width at base of antennae 199, and least width 172 (in holotype); vertex not produced and not overhanging, cheeks with the usual two pairs of subequal stout genal setae, these 80-91 microns long in holotype; postocular setae about 112 microns long, 63 from eyes, and 105 apart, their tips (like those of the genal setae) pale and somewhat rounded; ventral surface of head with relatively few hair-like setae, of which only about six project beyond the outline of each cheek. Eyes normal, about 0.25 the length of head, measuring as follows in microns (in one caustic-treated paratype with the length of head 778 microns): dorsal length 196, dorsal width 116, dorsal interval 139, ventral length 176, ventral width 120, ventral interval 130. Ocelli normal, the posterior pair with their centers distinctly in advance of a line drawn through middle of eyes, in the holotype 36 microns in diameter, 71 apart, and 129 from median ocellus, the latter slightly overhanging and with its posterior margin on a line with base of first antennal segment. Antennae very long and slender, about 3.1 times the length of the head, segment III about 708 microns long in larger individuals, only 570 in smallest, VIII slightly longer than VII and with a brief pedicel; sense-cones slender, setiform, disposed on the inner (and outer) surfaces of the segments as follows: III 1 (1), IV 2 (2), V 1 (1), VI 1 ( $0^{+1}$ ), VII 1 dorsal; sense-cone on outer surface of III about 134 microns; outer dorsal seta on I about 125 microns long and 10 microns in diameter near base. Mouth-cone broadly rounded at tip, in holotype extending 239 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum about 0.48 that of head and contained in the trans-coxal width about 2.2 times, its dorsal surface delicately and inconspicuously



sculptured, with a short median apodeme in front of middle, epimeron not fused with pronotum; antero-angular and epimeral setae ordinarily longer and stronger than the others and arising from large tubercles, but all setae highly variable, in holotype the antero-marginals 56, antero-angulars 81, mid-laterals 76, epimerals 154, postero-marginals 70, coxals 77. Fore legs normal to the genus; fore tarsi with a minute low tooth in heterogonic minima individuals, with a strong curved tooth in maxima ones. Wings typical, the fore pair with about 65 accessory setae in holotype and with the subbasal setae respectively 93, 90, and 194 microns; fringing setae on posterior margin of fore wings and on anterior margin of hind wings distinctly roughened or nodulated, the nodulation pronounced on the more basal setae and disappearing in the apical ones. Pterothorax sparsely pubescent ventrally, the setae projecting scarcely at all beyond the anterior and lateral outline; metanotal setae of holotype 242 microns long and 168 apart.

Abdomen normal in form and structure, broader than pterothorax; tergum III with a median posterior elevation from which, in heterogonic maxima individuals, arise two forwardly-directed triangular chitinous teeth which are formed much as in the genotype; setae moderately long, those on segment IX approximately 500 microns long. Tube very long and slender, about 2.3 times the length of head and about nine times as long as its own greatest basal width, this about 1.6 times the width at apex, its surface with heavy longitudinal wrinkles, and with slender, nearly black, clothing setae except at base and apex.

Measurements of male (holotype), in mm.: Length about 7.64 (distended, 8.47); head, total length 0.721, width across eyes 0.351, the greatest width at posterior angles of eyes 0.345, least width shortly behind eyes 0.280, greatest width across cheeks (at about their basal third and exclusive of tubercles) 0.345, least width near base 0.307, width across basal collar 0.318; prothorax, median length of pronotum 0.344, width (inclusive of coxae) 0.750; pterothorax, greatest width 1.16; abdomen greatest width (at segment II) 1.30; tube (segment X, only), length 1.68, greatest width (at segment II) 1.30; tube (segment X, only), length 1.68, greatest subbasal width 0.181, least apical width 0.111.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	140	105	708	427	399	227	127	139
Width (microns):	110 <sup>25</sup>	64 <sup>25</sup>	63	63	54	46	39	31
Total length of antenna, 2.272 mm.								

**Female** (macropterous). — Color identical with that of male and structure very similar; fore wings of one female paratype 3.67 mm. long, 209 microns wide at middle, and 242 microns wide subapically; fore tarsi unarmed.

**Measurements** of females (allotype, caustic-treated), in mm.: Length about 6.90 (fully distended, 7.68); head, total length 0.725, width across eyes 0.339, greatest width at posterior angles of eyes 0.311, least width shortly behind eyes 0.277, greatest width across checks (exclusive of tubercles) 0.305, least width near base 0.279, width across basal collar 0.295; cephalic process, length 0.113, greatest width 0.192, least width 0.168; eyes, dorsal length 0.193, dorsal width 0.103, dorsal interval 0.134, ventral length 0.160, ventral width 0.115, ventral interval 0.109; posterior ocelli, diameter 0.033, interval 0.064, distance from median ocellus 0.126; postocular setae, length 0.109, interval 0.103, distance from eyes 0.046; genal setae, length 0.094; mouth-cone, length beyond posterior dorsal margin of head 0.239; prothorax, median length of pronotum 0.272, greatest width (inclusive of coxae) 0.697; antero-marginal setae, length 0.047, antero-angulars 0.085, midlaterals 0.064, epimerals 0.130, postero-marginals 0.094, coxals 0.070; pterothorax, greatest width 1.03; abdomen, greatest width (at segment III) 0.107; tube (segment X, only), length 1.62, greatest subbasal width 0.176, least apical width 0.099.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	119 <sup>26</sup>	102	630	417	358	221	129	133
Width (microns):	96 <sup>27</sup>	63 <sup>27</sup>	57	53	53	44	37	28
Total length of antenna, 2.109 mm.								

**PERU:** Tambo de Vacas, Dept. Huanuco (elev. ca. 3000 m.), November 20, 1937, 8 ♂♂ and 23 ♀♀ (including holotype and allotype) [Hood No. 1478]. — San Domingo, Dept. Huanuco (elev. ca. 3000 m.), November 18, 1937, 4 ♂♂ and 11 ♀♀ [Hood No. 1477]. — Rioja (Minas, Rio Seco, elev. ca.

<sup>25</sup>) Basal width.

<sup>26</sup>) Dorsal exposed length.

<sup>27</sup>) Basal width.

900 m.), Dept. San Martin, September 18-23, 1936, 2 ♀♀ [Hood No. 1135]; Rioja (elev. ca. 900 m.), October 1, 1936, 1 ♂ and 2 ♀♀ [Hood No. 1142]. — San Pedro (region of Satipo, elev. ca. 900 m.), Dept. Junin, May 3-29, 1935, 3 ♂♂ and 6 ♀♀ [Hood No. 1127]. All of this material was taken by Mr. Felix Woytkowski from dead branches, tree trunks, and leaves.

Although one can readily distinguish this species from *regalis*, even with a hand lens, on the basis of the shorter, fewer, and less conspicuous setae which clothe the lower surface of the head, thorax, and abdomen in both sexes, the most satisfactory method of separating the males is by the use of the heterogonic teeth on the third abdominal tergum. In *fratercula* such teeth make their appearance in individuals whose growth during the nymphal stadia permits them to attain a distended length of approximately 7.5 mm. when adult, and hence all individuals smaller than this lack the teeth and all which are larger have them developed in geometrical proportion according to their excess in length over and above 7.5 mm. In *regalis*, however, of which I now have 25 specimens, the teeth do not appear until the total distended length is about 11 mm. Thus the heterogonic curves of these structures in the two species, when plotted in the usual manner, are found to be widely different in their point of origin and approximately parallel, with apparently no possibility of their merging into one straight line with the plotting of additional points

56. *Eurythrips citricollis*, sp. nov.

Female, forma macroptera. — Length about 1.2 mm. (fully distended, 1.5 mm.). Color of head, pterothorax, and last three abdominal segments brown, the head much the darkest and nearly black at sides, the eighth abdominal segment yellow in basal half, the ninth darkest at sides, the tube paler apically and at base, the prothorax and basal abdominal segments yellow; segments III-VIII of abdomen each with a small subbasal median brown spot, the more apical segments somewhat shaded with brown laterally; internal pigmentation opaque yellow or orange; legs bright pale yellow, with the middle and hind femora and tibiae more or less shaded with brown along inner and outer surfaces; fore wings dark brown basally, fading to pale brown in about middle third, darker again apically, with a colorless area along posterior margin between anal area and the first fringing hairs; antennae brown, paler in the two basal segments and in extreme base of segment III, its remainder dark

blackish brown; major setae yellow or brownish yellow, the terminal ones darker.

Head relatively short, scarcely 1.1 times as long as greatest width across cheeks and scarcely 1.2 times the width across eyes, distinctly narrowed behind eyes, broadest at anterior third of cheeks, these evenly rounded to eyes and decidedly concave in basal third, distinctly broadened across basal collar; head smooth and shining, excepting for the faintly subreticulate ocellar area and several distinct dark lines near base; postocular setae pointed, about 56 microns long, 99 apart, and 13 from eyes; other cephalic setae pale and pointed, the occipitals about 20 microns long and 39 apart; vertex and occiput somewhat elevated, the former slightly produced and somewhat overhanging. Eyes rounded, strongly protruding, moruloid, about 0.32 the length of head, dorsal length about 49 microns, dorsal width 36, dorsal interval 62. Ocelli about 16 microns in diameter, the median one at tip of vertex, directed forward, and with its posterior margin about 3 microns only in front of anterior margin of eyes, the posterior ones about 19 microns apart and 10 from median ocellus. Antennae somewhat stouter than usual, but otherwise typical, segment VII not at all closely united with VI, its pedicel only slightly broadened at base; all major setae pointed; sense cones slender and pointed, disposed as follows on the inner (outer) surfaces of segments: III 1 (2), IV 1 (2), V 1 ( $1\frac{1}{2}$ ), VI 1 ( $1\frac{1}{2}$ ), VII 1 dorsal. Mouth-cone short and broadly rounded, extending about 87 microns beyond posterior dorsal margin of head when the latter is strictly horizontal.

Prothorax along median line of pronotum about 0.64 the length of head and contained in the trans-coxal width about 2.2 times, its dorsal surface without sculpture except for a few distinct lines along posterior margin; epimeron largely fused with pronotum; antero-marginal setae minute (about 12 microns long) and pointed, the others pointed or somewhat rounded at tip, the antero-angulars 37 microns long, mid-laterals 53, epimerals 60, postero-marginals 57, coxals 24. Pterothorax distinctly wider than prothorax, without ventro-lateral knobbed setae. Legs not reticulate, fore tarsi with a small but distinct tooth at apex of first segment. Wings straight and of very nearly equal width throughout, the fore pair about 570 microns long and 47 microns broad at middle,

without accessory hairs, and with the three subbasal setae dull and respectively 41, 50, and 49 microns long.

Abdomen moderately large and heavy, about 1.2 times as broad as prothorax across coxae; dorsal surface almost smooth; major setae long, most of them pointed, the others dull rather than dilated at tip, the lateral one on VII about 100 microns, three pairs on IX pointed and respectively 132, 132, and 126, the terminal ones 78. Tube (segment X, only) 0.7 the length of head and about 1.65 times as long as greatest subbasal width, the latter twice the apical width, broadest across basal collar, its sides straight and evenly tapering in apical three-fourths.

Measurements of macropterous female (paratype), in mm.: Length about 1.23 (fully distended, 1.53); head, total length 0.154, width across eyes 0.133, least width just behind eyes 0.124, greatest width across cheeks 0.141, least width near base 0.133, width across basal collar 0.134; prothorax, median length of pronotum 0.099, width (inclusive of coxae) 0.224; pterothorax, greatest width 0.235; abdomen, greatest width (at segment IV) 0.262; tube (segment X, only), length 0.107, greatest subbasal width 0.065, least apical width 0.034.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	34	49	50	51	50	49	39	36
Width (microns):	36	30	29	30	28	26	21	16
Total length of antenna, 0.358 mm.								

Female, forma brachyptera. — Color and structure much as in macropterous form, except that the color averages somewhat paler and the eyes are of course smaller; ocelli present, about 15 microns in diameter, the posterior pair 23 microns apart and 12 from median ocellus; fore wings dark brown, about 127 microns long and 37 wide, with the three subbasal setae 36, 31, and 28 microns long, respectively.

Measurements of brachypterous female (paratype, caustic-treated), in mm.: Length about 1.23 (fully distended, 1.59); head, total length 0.160, width across eyes 0.112, least width just behind eyes 0.109, greatest width across anterior part of cheeks 0.133, least width near base 0.129, width across basal collar 0.134; eyes, dorsal length 0.029, dorsal width 0.022, dorsal interval 0.068; postocular setae, length 0.053, interval 0.086; mouth-cone, length beyond posterior dorsal margin of head 0.067; prothorax, median length of

pronotum 0.099, greatest width (inclusive of coxae) 0.242; antero-angular setae, length 0.046, midlaterals 0.053, epimerals 0.051, postero-marginals 0.062, coxals 0.026; pterothorax, greatest width 0.220; abdomen; greatest width (at segment IV) 0.281; tube (segment X, only), length 0.101, greatest subbasal width 0.067, least apical width 0.034; seta I on segment IX, length 0.117, II 0.120, III 0.125; terminal setae 0.077.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	36	47	49	45	48	48	39	35
Width (microns):	36	30	31	29	26	25	21	15
Total length of antenna, 0.347 mm.								

FLORIDA: Winter Park, March 11, 1941, Minter J. Westfall, Jr., 3 macropterous and 11 brachypterous ♀♀, under fallen Pine needles.

The coloration is unlike that of any other described species.

### Weitere Untersuchungen über Nestbau und Gartenpilz von *Atta cephalotes* L. und *Atta sexdens* L. (Hym. Formicidae)

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(Mit 9 Figuren und 5 Tafeln)

#### Einleitung

In einer früheren Mitteilung (Stahel & Geijskes, 1939) konnten wir zeigen, dass die Nester von *Atta cephalotes* und *Atta sexdens* nach einem fest bestimmten, einheitlichen Plan gebaut sind. Alle Einzelheiten des Baues dienen nur dazu, den Pilzkulturen dieser Ameisen die denkbar günstigsten Wachstumsbedingungen zu verschaffen.

Die gegenwärtigen Untersuchungen hatten den Zweck, durch erneuerte Ausgrabungen unsere Kenntnis der Nester und der Organisation des *Atta*-Staates zu erweitern und zu vertiefen. Wir untersuchten darum je ein ausgewachsenes und ein junges Nest der beiden Arten.

Nach dem Erscheinen unserer ersten Mitteilung über den Bau der *Atta*-Nester, erschien eine Publikation von Walter, Lee Seaton und Mathewson (1938) über *Atta texana*,

die Blattschneiderameise von Texas. Die 3 Untersucher beschäftigten sich besonders mit der Frage der Bekämpfungsmittel und der Erforschung der Myrmecophilen. Laut Ihren Angaben über den Bau der *texana*-Nester sind diese denjenigen von *Atta sexdens* sehr ähnlich.

#### Arbeitsmethode

Die Abgrabungen der Nester wurden in ähnlicher Weise durchgeführt, wie letztes Jahr. Wiederum wurden Vertikalschichten von genau 20 cm Dicke abgegraben. Von jedem Profil wurde eine Zeichnung gemacht und zwar 84 vom *cephalotes*-Nest und 56 vom *sexdens*-Nest. Diese Profile dienten dazu, den Nestplan rekonstruieren zu können. Das einzige, was mit dieser Methode nicht völlig erfasst werden kann, ist der Verlauf der stark gewundenen Kanäle zwischen den Gartenkammern, der jedoch durch die Untersuchungen von Jacoby (1935) schon genügend bekannt geworden ist.

Wir haben jedoch unsere Methode in diesem Jahre verbessert, sodass sie auch in unebenem Gelände brauchbar ist. Zu diesem Zweck wurden den beiden langen Seiten des Nestes entlang parallele Pfahlreihen in den Grund geschlagen, deren Kopfflächen genau in einer Ebene lagen, die mindestens so hoch war, wie die höchste Terrainerhebung im Nestgebiet. Auf diese Pfähle wurden nun dünne V-Balken gelegt und zwar so, dass eine Seite in einem mit der Säge angebrachten Spalt im Pfahlkopf zu liegen kam. Die beiden Balken lagen somit in der gleichen horizontalen Fläche (Taf. 15 und 16).

Sowohl im *cephalotes*- als auch im *sexdens*-Nest war die schmale Seite des Nestes 12 m breit, sodass als Abstand zwischen den beiden Balken 13 Meter gewählt wurde. Ein T-Balken von 14 m Länge wurde nun quer über die beiden Balken gelegt. Er war mit roter und weisser Farbe in Meterstücke eingeteilt, wie auch die Seitenbalken, auf denen uherdies noch eine Einteilung in 20 cm Abständen angebracht war.

Bei dieser Arbeitsweise hatten wir uns die Einteilung des Nestes mit Pfählen in Vierecke von 2 m Seitenlänge ersparen können. Leider aber bog der lange T-Balken so stark durch, dass diese Arbeitsweise sich als unbrauchbar erwies. Es wurde darum eine zwischen den Balken straff gespannte Leine als Niveau verwendet, während die Viereck-Einteilung des Nestes mit Pfählen bestehen blieb.

Die Vermessung der Profile war letztes Jahr recht zeitraubend. Als Abscisse wurden Bambus-Stäbe mit Meter- und 20cm-Einteilung verwendet, die der Oberfläche entlang befestigt waren, während die Ordinaten mit einer Messlatte von dort aus gemessen wurden. Diese lästige und nicht ganz genaue Arbeitsweise wendeten wir dieses Jahr nicht mehr an.

Dafür wurden je 2 Gitter von  $2 \times 2$  und  $2 \times 1$  m Grösse angefertigt, bestehend aus Eisenstäben von 5 mm Dicke. Die Stäbe haben einen Abstand von 25 cm und sind bei allen Kreuzpunkten zusammen geschweisst. Ausserdem besteht der Rahmen des Ganzen aus 1,5cm-V-Eisenstäben. Die  $2 \times 2$ m-Gitter haben 9, die  $2 \times 1$ m-Gitter aber 6 lang-zugespitze Nagel von 10 cm Länge, die bequem in die Profilwand

gedrückt werden können. Die 1-Meter-Stäbe wurden weiss gemalt, die  $\frac{1}{2}$ -Meter-Stäbe rot und die dazwischen liegenden 25cm-Stäbe grün. Das Gitter wurde nun so gegen die Wand gelegt, dass die Seiten auf die Pfahlreihen eingestellt waren, während der obere Rand die straff gespannte Leine eben berührte. Darauf wurden die Gitternägel in die Wand gedrückt. Es kostete einige Mühe, die Arbeiter daran zu gewöhnen, die straff gespannte Leine mit den Gitternägeln nur eben zu berühren und nicht in die Höhe zu heben (Taf. 15 u.16). Die javanischen Arbeiter lernten aber bald auch dies genau und richtig auszuführen.

Nun wurde auf viereckig liniertes (Grossformat-Schreibpapier ein farbiges Gitter gezeichnet, genau wie das genannte Gitter aus Eisenstaben, nur wurden die weissen Stäbe auf dem Papier schwarz wiedergegeben. Ausserdem wurde zur besseren Orientierung in Uebereinstimmung mit der Gittergrösse auf dem Papier jede zweite Meterlinie dick ausgezogen. Das Einzeichnen der Profile auf das auf diese Weise linierte Papier war somit ausserordentlich einfach und bequem. In kurzer Zeit war selbst ein reichhaltiges Profil mit allen Kammern, Gängen, Gruben und Zisternen in dieses Gitterschema eingezeichnet und das zeitraubende, lästige Ausmessen der Profile fiel vollkommen weg. Es wurde darum dieses Jahr auch nicht gewartet mit dem Konstruieren des Nestplanes, bis alle Profile fertig waren. Während der eine von uns die Profile zeichnete, konstruierte der andere zur gleichen Zeit den horizontalen Nestplan. Ein Assistent befand sich in der Grube, um die nötigen Informationen zu geben. Nur in Ausnahmefällen mussten wir uns selber in die Grube begeben.

Diese Methode, die sich in diesem Jahre in jeder Beziehung ausgezeichnet bewahrte und die Aufnahmearbeit weitgehend erleichterte, lässt sich auch auf geneigtem Gelände verwenden. Man orientiert in diesem Falle die Seitenbalken und somit auch die Aufnahmeplatte in der Richtung des Gehanges, während der obere und der untere Rand genau horizontal verlaufen. Man beginnt dann das Nest vom unteren Rand her abzugraben. Die senkrechte Gitterfläche bildet in diesem Falle also nicht mehr einen rechten Winkel zur Orientierungsfläche.

### Das Nest von *Atta cephalotes* in Paramaribo

Dieses Nest befand sich in einem Sandriff am Sompeldijkschen Kreek, der durch den nördlichen Teil der Stadt strömt, und zwar am Rande einer Anpflanzung von Kakao. Das Land war durch Entwässerungsgräben in Beete eingeteilt, sodass die Nestoberfläche stellenweise recht uneben war.

Das Sandriff, ein alter Meeresstrand, war an dieser Stelle etwa 140 cm tief und 100 m breit, und ruhte auf graublauem, sehr zähem Seeklei. Durch das Riff lief in der Tiefe eine etwa 30 cm dicke, harte, aus Muschelbreccie bestehende Bank, die an vielen Stellen mit dem Pickel zertrümmert werden musste.

Zur Zeit des Abgrabens gegen Ende der grossen Trock-



enzeit befand sich der Grundwasserspiegel 200 cm, in der schwersten Regenzeit im Mai und Juni dagegen nur etwa 40 cm unter der Oberfläche, also 160 cm höher.

Vom Frühjahr ab hatten wir dieses Nest regelmässig beobachtet. Die Laubernte bestand zum grössten Teil aus den Blättern von Liberia-Kaffee, der sich jenseits eines tiefen Entwässerungsgrabens befand. Bei hohem Wasserstand war der Baumstamm, der den Graben überbrückte, überströmt, sodass wir noch einige weitere Stämme darüber legen mussten, um den Ameisen den Besuch ihrer bevorzugten Blattweide bei jedem Wasserstand zu ermöglichen. Ueberall schnitten sie die Blätter in den Kronen der etwa 3 m hohen Kaffeebäume, während die Schattenblätter der unteren Zweige kaum Beachtung fanden. Daneben wurde z. B. im April auch eine grosse Katappa (*Terminalia Catappa*) in wenigen Tagen vollständig entblättert. Auch wurden die Blätter von *Cecropia palmata*, von *Mimosa americana*, von Bananen und einigen anderen Pflanzen geschnitten. Die zahlreichen Kakao-Bäume wurden aber kaum beachtet. In der Trockenzeit sahen wir die Ameisen auch Brocken von weisslichem Pflanzenschleim ins Nest schleppen, auch Stücke der wasserspeichernden dicken Blätter der epiphytischen Gesneriacee *Codonanthe calcarata*.

Während der Regenzeit tragen die Ameisen oft 1-2 Wochen hintereinander Tag und Nacht Blätter ins Nest. Die 20-30 cm breiten Wege werden dann in ihrer ganzen Breite von den wandernden Blattstücklein eingenommen. Auf 3-4 Wegen kommen sie heran, die meisten aus dem Kaffeefeld. Hört das Regenwetter aber auf und wird es wieder trocken, dann sind die Wege tagsüber verlassen. Beginnen die Blatträger aber wiederum bei Tag zu laufen, dann gilt dies hier als Zeichen, dass in Bälde Regen zu erwarten ist.

Auf eine Periode regster Tätigkeit kann eine Periode äusserlicher Untätigkeit folgen. Die Ameisen dürften dann damit beschäftigt sein, die erschöpfte Gartensubstanz nach den Abraumkammern zu bringen.

Als der Wasserstand im Mai und Juni besonders hoch war, waren die grossen Löcher am Rande des Nestes, in welche sonst frische Luft einströmt, teilweise oder ganz mit Wasser gefüllt. In der Regenzeit funktioniert also das normale Ventilationssystem zeitweise nicht. Dafür aber wurden die Eingänge über den Gartenkammern stark erweitert und teil-

weise kegelförmig erhöht, sodass kleine Schornsteine entstanden.

Wir haben auch dieses Jahr wiederholt die Durchlüftung des Nestes mit Rauch untersucht und zwar mit dem gleichen Resultat, wie letztes Jahr. Auch über dem Gartengebiet fanden wir oft Löcher, die den Rauch einsogen. Dieser entweicht aber jeweils wieder aus einem nur wenige Dezimeter entfernten

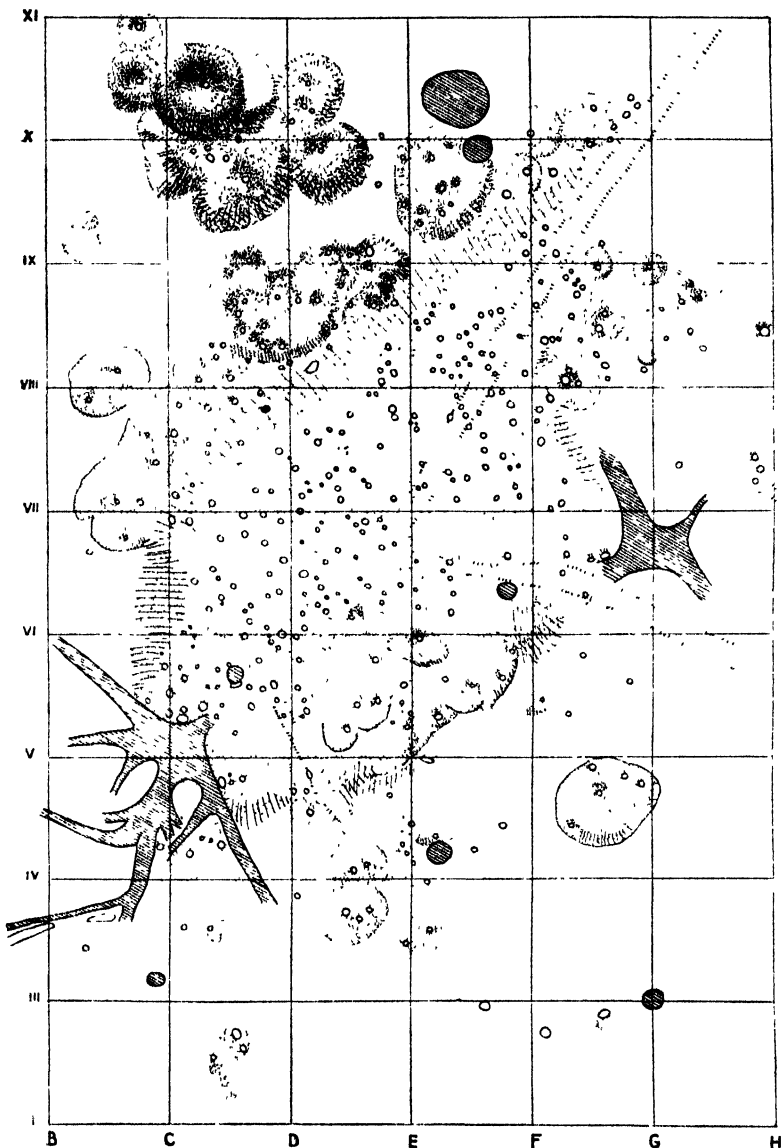


Fig. 1. Oberfläche des Nestes von *Atta cephalotes* in Paramaribo; links oben die grossen Sandhügel über den Abraumgruben; in der Mitte das Gartengebiet mit einigen Erdhügeln über den Zisternen; Einteilung in Quadrate von 2 Metern.

Loch, das fast immer in der Windrichtung liegt. Wir haben es hier also mit sekundären, durch den Wind bedingten Luftströmungen in den oberflächlichen Kanälen zu tun, auf welche die Ventilation in der Regenzeit hauptsächlich angewiesen zu sein scheint.

Im Gebiet der Abraumgruben, das isoliert auf einer Seite des Nestes lag, war während der Regenzeit nicht die geringste Tätigkeit zu beobachten. In der Nestzone dagegen wurde bei einigen Löchern etwas grauschwarze Erde herausgeschafft, ohne dass eigentliche Hügel entstanden.

Als die Trockenzeit kam, wurden die Oeffnungen kleiner, und zu gleicher Zeit wurde die Oberfläche über den Pilzgärten mit Blattstücklein bedeckt, wie wir es schon letztes Jahr beim *cephalotes* Nest bei Welgedacht C feststellen konnten. Durch diesen isolierenden Filz dürfte das Austrocknen des Gartengebietes verzögert werden.

Zu gleicher Zeit wurden im Gebiete der Abraumgruben mächtige Erdhügel aufgeworfen. Tag und Nacht schleppten hier die Ameisen ununterbrochen ihre Frachten heraus.

Mit der fortschreitenden Trockenzeit entstanden auch besonders am Rande der Nestzone grössere Erdhügel, die zuerst aus braunem Sand, später aber aus graublauem Klei bestanden. Da auf diesem Sandriff nur die Zisternen bis zum darunterliegenden Seeklei durchdrangen, gaben diese Kleihügel ein anschauliches Bild von der Verteilung der Zisternen in der Nestzone (Fig. 1).

Das Abgraben des Nestes dauerte 10 Tage (12. Okt. und 23. Okt. bis 2. Nov. 1939), wobei 330 m<sup>3</sup> Erde ausgehoben wurden. Das Nest enthielt 632 Pilzgärten. Im Ganzen wurden 84 Profile gezeichnet. Zwei grosse Schattenbaume, die auf dem Nest standen, verursachten uns viel Arbeit, weil zahlreiche Pilzgärten unter deren Wurzeln angelegt waren.

Der Bauplan stimmt, wie Fig. 2 zeigt, mit demjenigen der beiden grösseren *cephalotes*-Nester vom letzten Jahr überein. Schon vor dem Abgraben konnte genau festgestellt werden, wo das Abraumgebiet und wo die Gartenzone lag. Wiederum war das Abraumgebiet streng geschieden vom eigentlichen Nest. Nicht ein einziger Garten befand sich dort (Fig. 2).

Wie der Grundriss zeigt (Fig. 2), sind die Zisternen in diesem Nest besonders zahlreich vorhanden. Nicht weniger als 26 Wasserschächte wurden aufgezeichnet. Da der Grund-

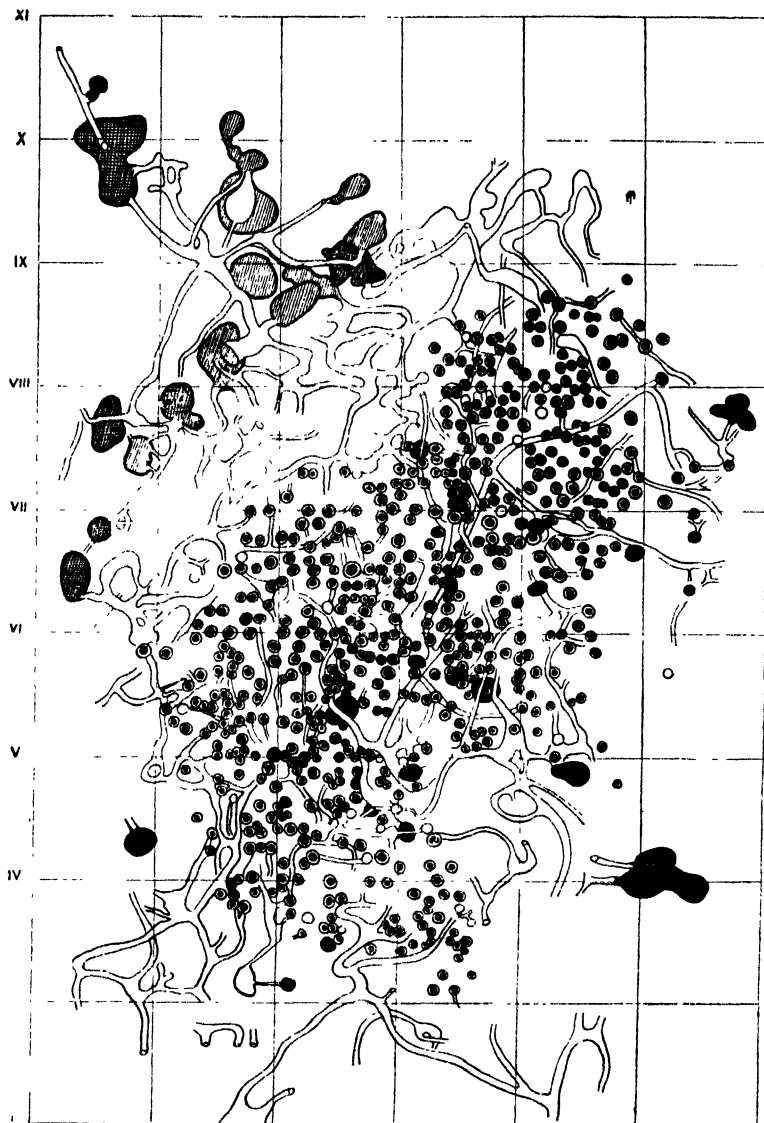


Fig. 2. Grundriss des Nestes von *Atta cephalotes* in Paramaribo; besonders zahlreiche Zisternen (schwarz); links oben die Abraumgruben (die gefüllten sind doppelt schraffiert).

wasserstand in den letzten Wochen vor dem Abgraben rasch gesunken war, erreichte vorläufig nur ein Teil der Zisternen den Grundwasserspiegel, der sich zur Zeit ungefähr auf einer Tiefe von 2 m befand. Alle aber befanden sich schon im nassen Klei. Offensichtlich kostete es den Ameisen viel Muehe, die harte Muschelschale über dem Klei zu durchdringen. Es

kam darum mitunter vor, dass der Kanal, der zur Zisterne führte, erst eine Strecke weit horizontal dem oberen Rand der Breccie folgte, bis eine passende Stelle gefunden war, diese zu durchbrechen. Einige Zisternen sind im Klei stark erweitert, andere aber streben mehr röhrenförmig dem Grundwasser zu (Fig. 3).

Da das Wasser des Sommelsdijkschen Kreekes, der etwa 30 m entfernt vorbeifliesst, in der Trockenzeit stark brackig ist, enthielt das Wasser in den Zisternen zur Zeit des Abgrabens 0.14% Chlor. Vielleicht war dieser Salzgehalt die Schuld, dass die Ameisen dieses Nestes auf der Suche nach Süsswasser so ungewöhnlich zahlreiche Zisternen gruben.

Auch hier waren die Abraumgruben mächtige Hohlräume von wechselnder Form. Da der Abraum in diesem nassen Jahr besonders lange und ganz unter Wasser gestanden hatte, waren nur wenig Insekten darin zu finden und keine einzige *Amphisbaena*. Dafür fanden wir wiederum eine der blaugrünen Schlangen, die wir schon letztes Jahr im Nest auf dem Sandriff von Charlesburg vorgefunden hatten.

#### Das Nest von *Atta sexdens* bei Lelydorp

Dieses Nest lag auf einem Lehmücken 3.5 km südlich von Lelydorp und etwa 30 m westlich des Eisenbahndammes. Der Untergrund besteht hier aus demselben braunen sandigen Lehm, wie der, in dem sich das etwa 800 m von hier entfernte *sexdens*-Nest am Arubaweg befand, das letztes Jahr abgegraben wurde. Auch hier erscheint der Lehm in der Tiefe rotbraun marmoriert. Nie aber verdichteten sich diese rotbraunen Flecken zu harten Eisenkonkretionen, wie es am Arubaweg der Fall war.

Der Lehm ist hier, wie vielerorts im Gebiet von Lelydorp, von weissem Quarzsand überschichtet, der an dieser Stelle eine Mächtigkeit von ungefähr 50 cm besitzt. Wo früher Urwaldbaume gestanden hatten, deren tiefgehende Pfahlwurzeln nach dem Absterben verwitterten, strömte der pulverige weisse Quarzsand in die Tiefe und füllte die Stelle aus, wo sich früher die Pfahlwurzel befunden hatte. Oeffters kamen beim Ausgraben solche bizarre Längsschnitte durch Wurzelstöcke zum Vorschein (Taf. 16).

Das Grundwasser befand sich in diesem Nest nur etwa

270 cm unter der Oberfläche, also etwa 70 cm höher als beim *sexdens*-Nest, das letztes Jahr abgegraben wurde.

Während 14 Tagen (13.-28. Nov. 1939) wurden hier 480 m<sup>3</sup> Erde ausgehoben und 56 Profile gezeichnet. Die Nestoberfläche war mit Gras, mehreren Gebüsch und Palmen bedeckt, die dem Abgraben nur unbedeutende Hindernisse in den Weg legten.

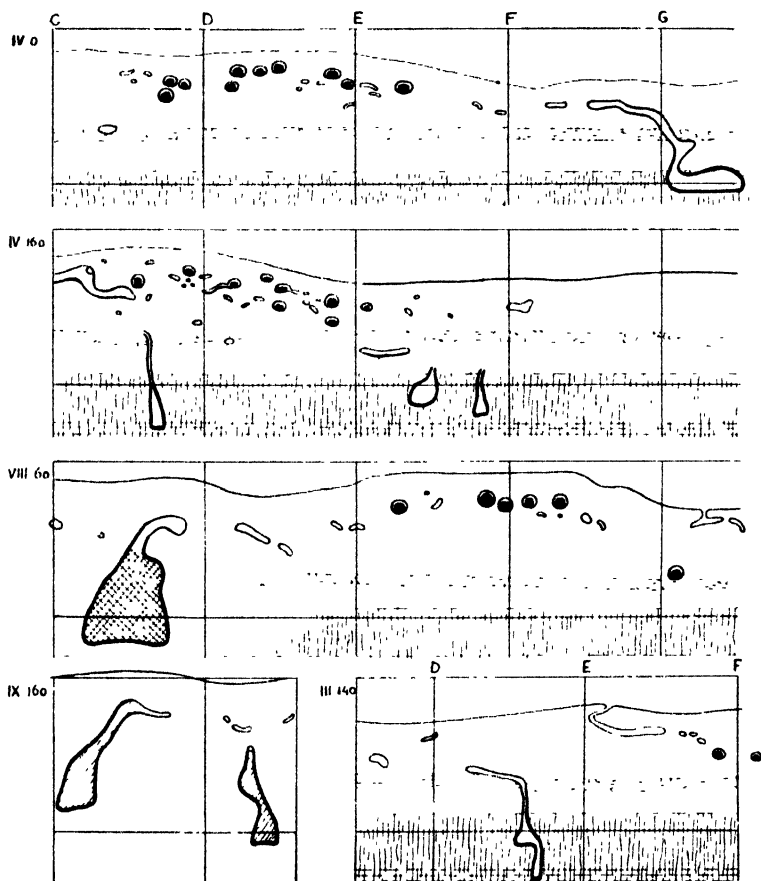


Fig. 3. Profil des Nestes von *Atta cephalotes* in Paramaribo; Einteilung in Quadrate von 2 Metern; zwei leere Abraumgruben einfach, eine gefüllte doppelt schraffiert; die übrigen Gruben sind Zisternen.

Zuerst wurden sorgfältig alle Erdhügel und Nestöffnungen aufgenommen, worauf eine Fläche 12×12 m mit Pfählen in 2m-Vierecke eingeteilt wurde, flankiert durch 2 Längsbalken, welche die Orientierungsfläche markierten. Während aber bis jetzt bei allen *cephalotes*-Nestern und auch bei dem von *Atta sexdens* am Arubaweg die durch uns abgepfahlte Fläche auch

wirklich das ganze Nest bedeckte, war das ganz unerwarteter Weise bei diesem Nest nicht der Fall.

Beim Abgraben zeigte es sich nämlich, dass ein ansehnlicher Teil des Gartengebietes ausserhalb der abgepfahlten Fläche lag und zwar unter einem mit leichtem Graswuchs bedeckten Stück Land, wo kein Erdhügel, keine Oeffnung, wirklich nichts vermuten liess, dass sich darunter etwa 200-250 von den 1000-1100 Gärten dieses Nestes befanden.

Es ist wohl kaum daran zu zweifeln, dass dieser Teil der älteste des Nestes war. 1-2 Jahre zuvor war hier die Oberfläche wahrscheinlich mit Erdhügeln und Oeffnungen bedeckt, die in der Regenzeit weggespült und nivelliert wurden. Danach fanden hier keine Neubauten mehr statt, sodass auch keine Erde mehr heraus geschafft werden musste. Die Eingänge für die Ameisen und die frische Luft befinden sich aber im *sexdens*-Nest weit von den Gärten entfernt, weswegen die Lage der ältesten Gartengebiete nach aussen ganz verborgen sein kann, da auch die Luft über dem jüngeren Gartengebiet entweicht und auch der Abraum in den dortigen Gruben deponiert wird.

Wenn wir den Nestplan (Fig. 5 u. 6) betrachten, dann erkennen wir, dass sich das Nest nach rechts oben ausgebreitet hat. Hier, über diesem jungen Nestgebiet, findet man zahlreiche frisch ausgeworfene Erdhügel mit vielen Nestöffnungen, durch welche die Erde herausbefördert wird. Unter dem jüngsten Teil, also rechts oben, befanden sich in der Tiefe die Abraumgruben, die gleich gebaut waren wie diejenigen, die wir im *sexdens*-Nest am Arubaweg fanden. Auch im übrigen ist der Nestbau genau der gleiche wie beim schon letztes Jahr untersuchten *sexdens*-Nest. Allein dieses Nest war etwas untiefer, weil der Grundwasserstand höher lag.

Auch in diesem Nest fanden wir keine einzige Gartenkammer, die mit Abraum gefüllt war, wohl aber mehrere, die mit Erde vollständig vollgestopft waren.

Auch die völlig senkrechten, engen Ventilationsschächte, von denen Eidmann (1935) eine so klare Zeichnung gibt, haben wir dieses Jahr wiederum bei keiner einzigen der 820 von uns geöffneten Gartenkammern gesehen.

Unter einem besonders grossen Pilzgarten fanden wir 60 cm unter der Oberfläche 6 junge, etwa 15 cm lange Individuen von *Amphisbaena alba* und in der Tiefe von drei der langen röhrenförmigen Zisternen entdeckten wir je einen

braunen, sehr schlüpfrigen Aal, *Symbranchus marmoratus*, der sowohl hier, als auch überall in den wärmeren Gebieten von Süd-Amerika häufig in Bächen und Sümpfen vorkommt und sich in der Trockenzeit tief in den Schlamm eingräbt.

### Ein Jungnest von *Atta cephalotes* im Kulturgarten in Paramaribo

Im Arboretum des Kulturgartens, in welchem verschiedene einheimische Waldbäume angepflanzt sind, war am Rande eines untiefen Entwässerungsgrabens ein kleines *cephalotes*-Nest entstanden. Das Arboretum liegt auf einem Sandriff, das an der Stelle des *Atta*-Nestes eine Tiefe von 125 cm hat. Darunter liegt graublauer, zäher Seeklei. Die Lage dieses Nestes war an einer kleinen Gruppe frisch ausgeworfener Erdhügel zu erkennen. Zur Zeit des Abgrabens lag der Grundwasserspiegel 180 cm unter der Oberfläche.

Die Abgrabung dieses Nestes hatte den Zweck festzustellen, ob auch schon sehr junge Nester mit Abfallgruben und Zisternen ausgestattet sind. Dieses Nest wurde am 8. und 9. November 1939 untersucht. Es wurden 8 m<sup>3</sup> Erde ausgehoben und 14 Profile gezeichnet.

Die 23 kleinen, niedrigen Pilzgärten, die wir in diesem Neste vorfanden, lagen nicht tiefer als 5-10 cm unter der Oberfläche. Lief man über das Nest, dann sank der Fuss wiederholt in die oberflächlichen Gartenkammern ein.

Von diesen Kammern aus führte ein Kanal in die Tiefe. Im Klei erweiterte sich dieser glockenförmig zu einer 50 cm weiten Kammer mit einem flachen Boden, der 150 cm unter der Oberfläche lag. Auf dieser Höhe hatte sich noch vor kurzer Zeit der Grundwasserspiegel befunden, der aber zur Zeit des Abgrabens schon 30 cm tiefer gesunken war.

Offensichtlich war dieses Jungnest zu wenig volkreich, um den breiten Boden dem schnell schwindenden Grundwasserstand folgen lassen zu koennen. Die Ameisen hatten deshalb den Durchmesser der Zisterne, den sie zu gross gewählt hatten, vermindert, indem sie in der breiten Bodenfläche 2 röhrenförmige Gruben von nur 8 cm Durchmesser anlegten, die es ermöglichten, mit den zur Verfügung stehenden Arbeitern das Grundwasser wieder einzuholen, wenigstens mit der einen Röhre. Der Boden der 2ten war zur Zeit des Abgrabens noch 5 cm davon entfernt. In der Nähe dieser Zisterne, im Profil rechts, sehen wir noch einen zweiten Wasserschacht



im Anbau. Der Gang war schon bis in den Klei durchgedrungen und erweiterte sich dort glockenförmig. Der Boden dieses etwa 15 cm hohen Raumes war jedoch noch 35 cm vom Grundwasserspiegel entfernt. In diese feuchte Kammer hatten die Ameisen eine grössere Anzahl ihrer weissen Puppen gerettet.

Neben der grossen Zisterne befand sich eine weitere Grube, die nicht glockenförmig, sondern zylinderförmig war. Im Gegensatz zu den beiden Zisternen, die sich erst im Klei erweiterten, lag diese Grube ganz im Sand. Zweifellos haben wir es darum hier mit der ersten Abraumgrube zu tun, in der sich aber zur Zeit des Abgrabens noch kein Abraum befand.

Offenbar hatte diese junge Kolonie ihre ganze Arbeitsmacht mobilisiert, um diese Werke, besonders die grosse Zisterne, anzulegen. Dies beweist aufs deutlichste, eine wie wichtige Rolle diese Wasserschächte im Haushalte der *Atta*-Nester während der Trockenzeit spielen. Der ausgegrabene nasse Klei lag oben auf den Nesthügeln und wurde nirgends im Gartengebiet verwendet. Die Ameisen werden deshalb das Wasser nur in ihrem Kropf, der vor dem Magen im Hinterleib liegt, nach den feucht zu haltenden Pilzgärten bringen können, in gleicher Weise also, wie die Bienen Nektar und Wasser nach ihren Stöcken tragen und die Honigameisen zuckerhaltige Säfte nach dem Nest schleppen und dort aufspeichern.

In mehreren dieser Pilzgärten war hier die Gartenmasse zäher und fester als gewöhnlich und die Oberfläche war bedeckt von einer weissen fleischigen Kruste, die weisse Knollen von 1-2 cm Durchmesser bildete, genau wie wir das schon ein Jahr früher in einem Nest im gleichen Sandriff hatten feststellen können (1938).

In einem der Gärten fanden wir nun ein weiteres Entwicklungsstadium und zwar eine Gruppe von 3 typischen Hutanfängen eines Basidiomyceten, die mit bräunlichen Schuppen bedeckt waren, wie bei den jungen Hüten von Möller's *Rozites* (Taf. 17).

Auf dem Längsschnitt war aber noch nicht die geringste Spur einer Scheidung in Hut und Stiel zu erkennen. Diese wird sich wahrscheinlich erst zeigen, wenn die Hutprimordien die Erdschicht durchbrochen haben und der Aussenluft ausgesetzt sind.

Aus dem Inneren dieser Hutanfänge entnahmen wir mit einer Platinnadel aseptisch kleine Stücklein des Pseudoparenchyms und brachten sie auf Nähragar, worauf sich schon nach 10 Tagen die ersten Kohlrabihäufchen bildeten, die sich weiterhin in reichlichen Mengen entwickelten. Diese Hutanfänge gehören also mit Sicherheit zum Nestpilz.

Als wir kurz zuvor das grosse volkreiche *cephalotes*-Nest auf dem Sandriff am Sommelsdijkschen Kreek abgruben, war

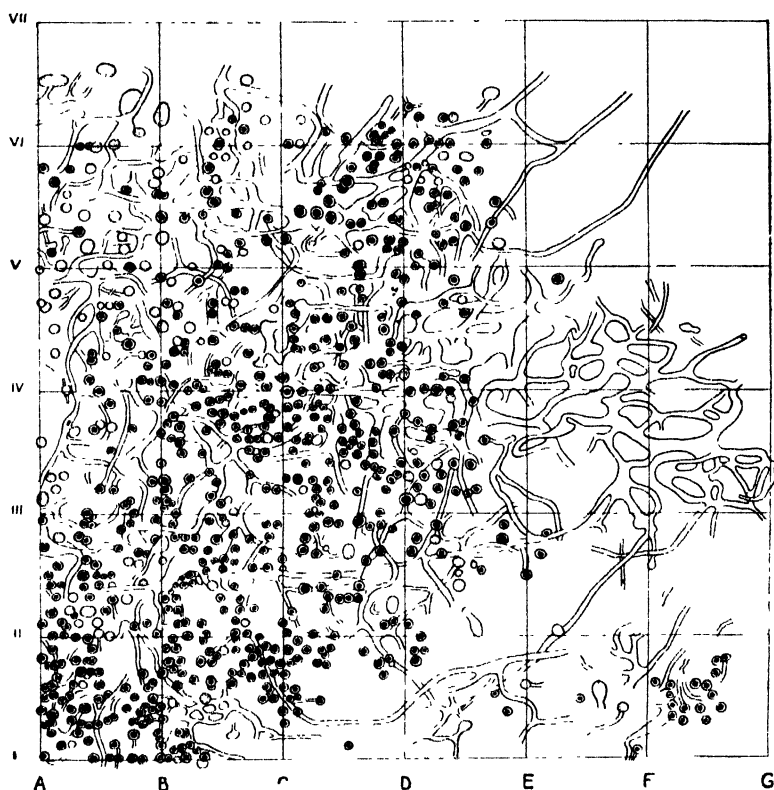


Fig. 4. Grundriss des Nests von *Atta serdens* bei Lelydorp, Tiefe 0-150 cm, die mit Sand gefüllten Kammern sind punktiert

in keinem einzigen der 632 Gärten auch nur eine Spur von Krustenbildung zu erkennen, alle waren ganz normal.

Wir legten nun mehrere dieser Krusten auf und neben einen üppigen Pilzgarten einer künstlichen Kultur in einem grossen Blumentopf. Die Kruste breitete sich schnell auf den normalen Garten aus. Unverweilt aber begannen die Ameisen vom Erdarbeiter- und Blattschneidertypus die Kruste abzubauen und über den Rand des Topfes ins Wasser zu werfen,

bis der letzte Brocken des zuvor gesunden Gartens verschwunden war und allein noch die Ameisen übrig blieben.

Offensichtlich mussten in unserem Nest die Pilzgärten zeitlich allein der Obhut der kleinsten Gartenameisen überlassen werden, die nicht im Stande waren, die Krustenbildung zu verhindern. Auch in dem kleinen Nest, worin wir 1938 zum ersten Mal diese Krusten- und Knollenform antrafen, waren die Ameisen eben beschäftigt, Wasserschächte und Abraumgruben auszutiefen und neu anzulegen. Auch im Gebiet von Lelydorp fand der Bekämpfungsdienst der Blattschneider-Ameisen wiederholt erhärtete Gärten und zwar ausschliesslich während der Trockenzeit.

#### Das kleine Nest von *Atta sexdens* bei Lelydorp

Nur etwa 30 m vom grossen *sexdens*-Nest, das wir dieses Jahr abgruben, entfernt, fanden wir einige Erdhügel, die ein Jungnest vermuten liessen. Bei der Untersuchung zeigte es sich aber, dass wir es hier aller Wahrscheinlichkeit nach nur mit einem Vorort des grossen Nestes zu tun hatten.

Das Nest wurde vom 22.-28. November 1939 abgegraben. Es wurden 42 m<sup>3</sup> Erde ausgehoben und 22 Profile gezeichnet. Als es sich zeigte, dass wir es hier nicht mit einem Jungnest, sondern wahrscheinlich mit einem im Rückgang befindlichen Vorort des grossen Nestes zu tun hatten, wurde das weitere Ausgraben aufgegeben.

Wir zählten 39 Gärten und eine etwas grössere Anzahl verlassener Kammern. Die letzteren waren in der Nähe der Oberfläche meistens mit Sand gefüllt. Die Pilzgärten waren hier im allgemeinen klein und 27 von ihnen lagen in der obersten 50cm-Zone. Der tiefste Garten lag 170 cm unter der Oberfläche.

Es wurden verschiedene von den röhrenförmigen Zisterne(n) gefunden, aber keine Abraumgruben. Wahrscheinlich lagen diese ausserhalb des abgegrabenen Teiles dieses Nestes.

Die Nester von *Atta sexdens* haben öfters solche Filial-Nester, die möglicherweise ihre Brut aus dem Hauptnest beziehen. Im Hinblick hierauf erinnern wir an das *sexdens*-Nest vom Arubaweg, von dem wir letztes Jahr eine Uebersichtskarte gaben (1939 Fig. 18). Nur 30 Meter vom Hauptnest entfernt war auch dort ein kleineres aktives Nest, das durch

einen geradlinigen, geräumigen Kanal auf 1,5 m Tiefe mit dem Hauptnest verbunden war.

Solche Filial-Nester kommen auch bei *Atta texana* vor. Die 3 schon erwähnten nordamerikanischen Autoren Walter, Seaton u. Mathewson schreiben:

«A number of queens may be found living in the same nest. During the winter the ants are more or less concentrated in the center, and the surface area of the nest is then relatively small. As

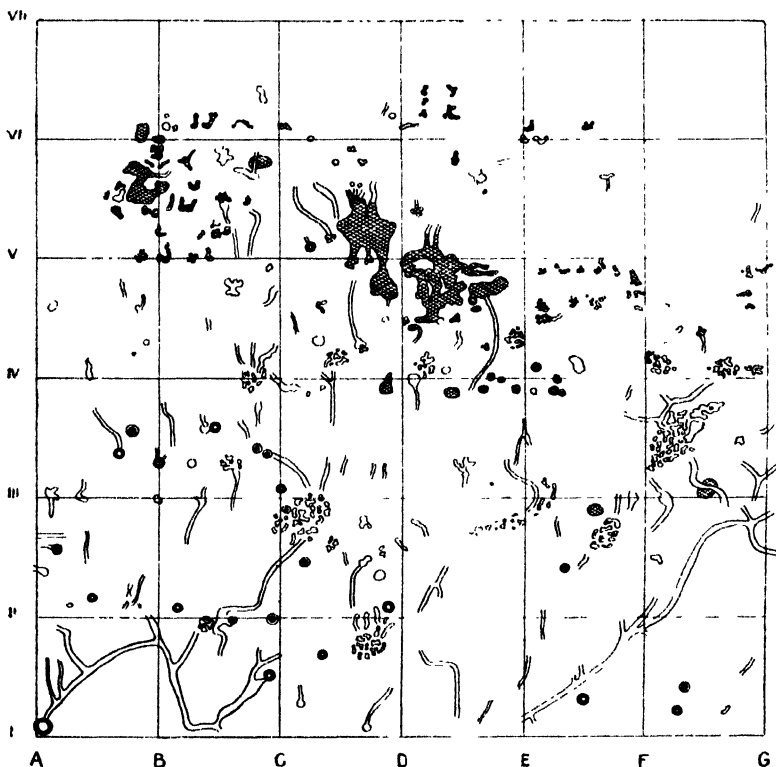


Fig. 5. Grundriss des Nestes von *Atta sardens*, Tiefe 150-270 cm; die Abraumgruben sind doppelt schraffiert.

the season grows warmer, the queens separate to more distant parts of the nest, each accompanied by a number of workers and soldiers. The nest then shows a much larger surface area. These migrating queens usually colonize in the immediate vicinity, so the surface gives the appearance of a single colony».

In der gleichen Arbeit teilen die 3 Autoren mit, dass sie im Winternest bis zu 3 Königinnen in einer einzigen Gartenkammer zählten. Ob wirklich bei *Atta texana* regelmässig eine grössere Anzahl Königinnen in einem Nest vorkommt,

sollte noch durch einige weitere Ausgrabungen bestätigt werden.

Bis jetzt wurde jedoch in den Nestern von *Atta cephalotes* und *Atta sexdens*, also bei den tropischen Formen, soviel wir wissen, nie mehr als eine einzige Königin gefunden. Auch wir haben einige Male Königinnen beim Abgraben angetroffen, aber niemals mehr als eine per Nest. Auch die Entstehung einer neuen Kolonie aus einer einzigen Königin spricht dafür, dass in der Regel nur eine Königin auch im ausgewachsenen Nest anwesend sein dürfte, in welche Richtung auch die Tatsache weist, dass die Grösse dieser Nester nicht allzu sehr voneinander abweicht.

Nach dem Ausschwärmen der Geschlechtstiere kann es, wie wir selbst beobachteten, vorkommen, dass verschiedene befruchtete Königinnen sich unweit von einander in die Erde eingraben, sodass an solchen Stellen die Möglichkeit nicht ausgeschlossen ist, dass auch bei den tropischen *Atta*-Arten Nester mit mehreren Königinnen entstehen. Dies dürften aber, unserer Meinung nach, Ausnahmefälle sein. Es wäre darum erwünscht, der Frage, ob die Nester der verschiedenen *Atta*-Arten monogyn oder polygyn sind, bei künftigen Untersuchungen mehr Aufmerksamkeit zu schenken, als bisher der Fall war.

### Die Basidiomyceten-Fruchtform des Nestpilzes

Die klassischen Untersuchungen Möller's haben gezeigt, dass der Pilz, den *Acromyrmex disciger* in seinen grossen, sehr untief liegenden Gärten züchtet, zu einem Basidiomyceten, *Rozites gongylophora*, gehört, der seine Hüte nur selten zur Entwicklung bringt. Erst kürzlich glückte es Autuori (nach brieflicher Mitteilung), diese Hutform in künstlichen Nestern von *Acromyrmex* zu züchten. Er hat somit nach Möller, also nach 48 Jahren, als erster diese *Rozites*-Hüte wieder gesehen.

Leider hat Wheeler in seinem bekannten Ameisenbuch die Befunde Möller's in ganz unberechtigter Weise in Zweifel gezogen. Er erklärt sogar, dass der Nestpilz seiner eigenen Meinung nach zu den Ascomyceten gehören dürfte, eine Meinung, die kaum von einem Mycologen, der den Nestpilz unter dem Mikroskop beobachten konnte, geteilt werden dürfte.

Wheeler's Schüler Weber berichtet, dass Möller keineswegs behauptet habe, dass die *Rozites*-Hüte zum Nestpilz von *Acromyrmex* gehören, sondern dass er lediglich festgestellt habe, dass diese auf den Nestern von *Acromyrmex* gefunden wurden. Dagegen bezeichnet Weber selber einen Hutpilz, den er zufällig in einem einzigen Exemplar auf einem *cephalotes*-Nest fand, ohne Vorbehalt und ohne stichhaltige Beweisgründe als Hauptfruktifikation des Nestpilzes und gibt ihm ohne Diagnose den Namen *Lentinus atticolus*. Er erwähnt nur, dass der Hutpilz durch Rhizomorphen mit einem «abandoned fungus garden» in Verbindung stand, also mit einer Abraumgrube. Dies und die Tatsache, dass das Hutfleisch durch die Ameisen nicht angefressen wurde, trotzdem er den Hutstiel in die Nähe eines durch die Ameisen viel besuchten Nesteinganges gelegt hatte, sprechen entschieden gegen seine Zugehörigkeit zum Nestpilz.

Wie es scheint, haben weder Wheeler noch Weber das neunte Kapitel von Möller's «Pilzgärten» gelesen, worin dieser ausführlich zeigt, dass nicht allein jedes aus dem Stiel und Hut von *Rozites* aseptisch entnommene Stücklein Gewebe in künstlicher Kultur ganz normale Kohlrabihäufchen bildet, sondern, dass dasselbe auch der Fall ist, wenn man den Pilz aus Basidiosporen züchtet. Ueber diese Kulturen schreibt Möller z.B. pag. 80:

«Durch die Züchtung der eigenartigen Kohlrabihäufchen aus den Basidiosporen ist der unanfechtbare Beweis geliefert, dass jene hochentwickelten Agaricineen-Hüte in der Tat die höchste Fruchtform der Kulturpflanze der Ameisen darstellen, dass es ihre Hyphen sind, welche in jedem Nest der untersuchten *Atta*-Arten ausnahmslos angetroffen werden und an welchen die Kohlrabihäufchen, das Futter der Ameisen, sich bilden.»

Auch in ihrer Arbeit über *Atta texana* schreiben Walter, Lee Seaton and Mathewson in Nachfolge Wheeler's über «several weaknesses in the work of Möller», einem Werk, das jedem Mycologen, der das Glück hat, die *Atta*-Gärten selbst untersuchen zu können, wegen seiner bis ins kleinste gehenden Akkurateesse Bewunderung abzwingt.

Im Jungnest von *Atta cephalotes* im Kulturgarten in Paramaribo fanden wir, wie schon erwähnt, 3 typische Fruchtkörperanfänge eines Basidiomyceten, bedeckt mit groben Schuppen, ähnlich wie bei Möller's *Rozites*, aber noch ganz ohne inwendige Differenzierung in Stiel und Hut.

Durch das Auffinden dieser 3 Fruchtkörperanfänge war der Beweis erbracht, dass auch der Nestpilz von *Atta cephalotes* noch im Stande ist, Fruchtkörper zu bilden, dass er also auch bei dieser Art nicht zu einer nicht mehr fruktifizierenden Gartenform degeneriert ist.

Warum aber hatte das Jungnest Krusten, Knollen und Hutanfänge gebildet, während das grosse Nest, das einige Tage zuvor abgegraben wurde, nicht die geringste Spur von solchen Bildungen zeigte? Zuerst vermuteten wir, dass die besonders oberflächliche Lage dieser jungen Gärten die Schuld an diesem abweichenden Verhalten haben konnte, mit anderen Worten: die erhöhte Ventilation.

Im Hinblick hierauf suchten wir Mitte November 10 *cephalotes*- und 5 *sexdens*-Nester aus, durch die wir mittendurch einen Graben von 50 cm Breite und 120 cm Tiefe gruben, um dem angrenzenden Gartengebiet des Nestes eine erhöhte Durchlüftung zuteil werden zu lassen.

Schon nach 4 Wochen fanden wir an den Grabenwänden wiederholt Hutpilze, besonders öfters eine *Psalliota* mit fleischigen, 8-10 cm breiten Hüten. Ihre Hutoberfläche war sandig rau, und von rotbrauner Farbe. Die Lamellen waren schwarzbraun und das Sporenpulver violettbraun. Der Ring war gut entwickelt. Diese Hüte bildeten sich aber mehr in der Tiefe, in der Nähe der Abraumgruben. Niemals wurden diese Hüte durch Ameisen angefressen. Reinkulturen aus dem Stiel- und Hutfleisch ergaben ein weisses Mycelium, das gänzlich verschieden war von dem des Nest-Pilzes. Auch aus den violetten Sporen erhielten wir dasselbe Mycelium.

Am 13. Januar 1940 fanden wir aber in einem *cephalotes*-Nest einen Hutpilz, dessen hohler Stiel von der Grabenwand aus bis zu einem Pilzgarten in der Tiefe verfolgt werden konnte. Der Hut war aber von den Ameisen schon zum grössten Teil weggefressen und auch im Stiel waren einige grosse Löcher.

Vergebens bemühten wir uns, von den fast ganz abgefressenen Lamellen Sporenpulver zu erhalten und dessen Farbe zu ermitteln. Die Ueberreste der Lamellen waren weiss oder leichtrosa. Die Hutoberfläche war grob schuppig, ganz wie bei *Rozites gongylophora*. Auch der Ring war vorhanden. Der Hut war aber bräunlich und nicht weinrot, wie Möller angibt. Er selber aber beobachtete auch Hüte, denen die rote Farbe fast ganz fehlte. Der untere Teil des Hutstieles

dagegen, der durch den Sand nach der Pilzkammer lief, war rot überlaufen.

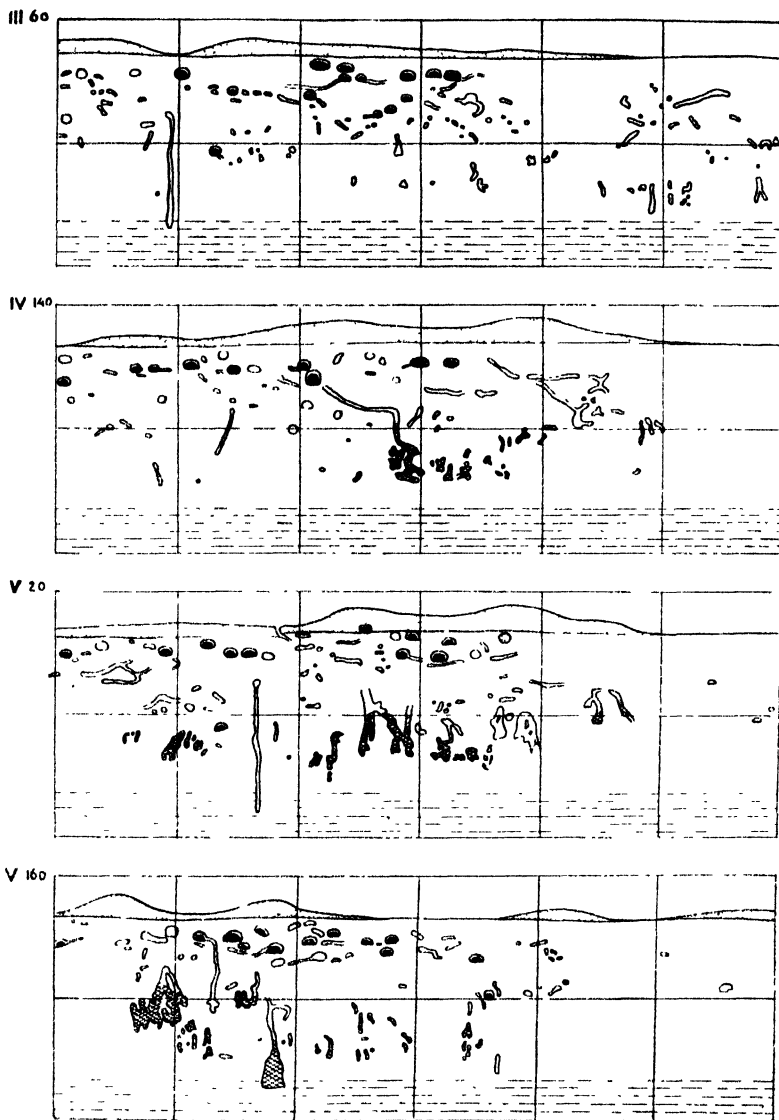


Fig. 6. Profile des Nestes von *Atta sedens* bei Lelydorp. Einteilung in Quadrate von 2 Metern.

Wir entfernten nun die zahlreichen Ameisen, die den Hut zerfressen, und nahmen ihn mit nach dem Laboratorium, wo wir mit aseptisch entnommenem Hut- und Stiefelfleisch Rein-kulturen anlegten, in denen schon nach 10 Tagen die ersten Kohlrahnhäufchen entstanden. Damit war zweifellos bewiesen,



dass dieser Hutzpilz die Hauptfruktifikation des Nestpilzes von *Atta cephalotes* darstellt.

Die Ueberreste dieses Hutes stimmen, soviel wir erkennen konnten, gut mit dem Möller'schen *Rozites* überein. Da ausserdem der Nestpilz von *Atta cephalotes* und *A. sexdens* mit seinen Kohlrabihäufchen, seiner «starken» Conidienform mit deren beiden Kulturformen, seinen «Stranganschwellungen», u.s.w. bis in Kleinigkeiten übereinstimmt mit Möller's Nestpilz von *Acromyrmex disciger*, ist kaum daran zu zweifeln, dass auch der *cephalotes*-Pilz zu *Rozites gongylophora* selbst oder einer Varietät dieser Art, oder wenigstens zu einer nahe verwandten Art gehört.

Wir haben später in keinem einzigen der 15 mit Gräben durchzogenen *Atta*-Nester diese *Rozites*-Hüte wieder gefunden. Wir unterliessen es leider, den Hut zu photographieren, weil wir überzeugt waren, in Kürze mehr und auch weniger beschädigte Hüte zu finden. Dies war jedoch nicht der Fall, trotzdem wir häufig die Nester besuchten und nachsehen liessen. Es ist somit zweifelhaft, ob die reichlichere Durchlüftung des Gartengebietes die Bildung der *Rozites*-Hüte befördert.

Das Nest, in dem wir den Hut gegen das Ende der grossen Trockenzeit fanden, war, wie es scheint, im Rückgang begriffen. Ausserdem haben wir die Pilzkrusten, Knollen und Hutanfänge, wie schon gesagt, in den kleinen Nestern ebenfalls nur in der Trockenzeit gefunden und auch in Lelydörp wurden sie wiederholt und allein in der Trockenzeit wahrgenommen. Es kommt uns darum wahrscheinlich vor, dass das Aufbieten der gesamten Arbeiterschaft für die Grabarbeiten in den Zisternen und Abraumgruben, die nur in der Trockenzeit ausgeführt werden können, die Bildung der *Rozites*-Fruchtform ermöglicht, da dann in den Gärten nur die kleinsten Arbeiter zurück bleiben, die die Krustenbildung offensichtlich nicht verhindern können.

Wir bemühten uns auch, die *Rozites*-Hüte aus dem Mycelium von Reinkulturen zu erhalten. Zu dem Zweck wurde der Pilz in Bierflaschen auf neutralem Rosinen-Peptonagar gezuchtet. 60 Literflaschen wurden mit je  $\frac{3}{4}$  l. Nährgar gefüllt, den wir nach dem Sterilisieren schief erstarren liessen. Das Kohlrabimycelium wächst langsam und es dauerte mehr als einen Monat, bevor es auf beiden Seiten das Glas erreichte. Die Kohlrabihäufchen bildeten einen geschlossenen Filz, der,

wie in den Pilzgärten, nur lose mit dem Mycelium im Nährboden in Verbindung steht. Mit der Platinnadel konnten wir darum diesen Pilz wegheben und aufrollen, wie wenn es eine dünne Lage Watte wäre.

Nach 3 oder 4 Wochen begann der älteste Teil des Myceliums in die Krustenform überzugehen und nach etwa 2 Monaten war das Kohlrabimycelium ganz verschwunden. Der Agar war nun von einer fleischigen, weissen oder etwas

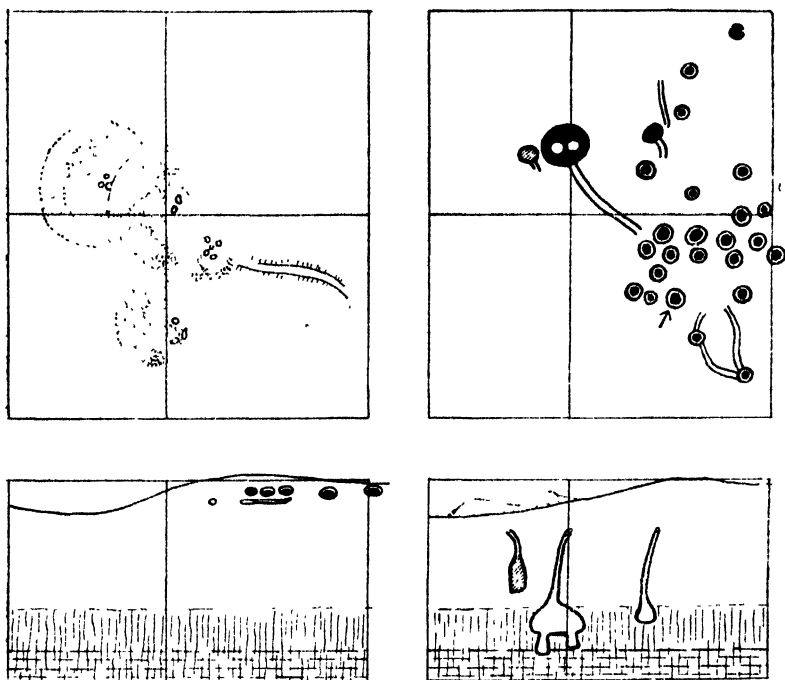


Fig. 7. Das Jungnest von *Atta cephalotes* im Kulturgarten von Paramaribo, links oben die Nestoberfläche; rechts oben der Grundriss, unten zwei Profile mit Gartenkammern, Zisternen und einer Abraumgrube.

bräunlichen, ungefähr 1/2 cm dicken Kruste von Pseudoparenchym bedeckt. Nach 4 Monaten wurden die Flaschen zertrümmert und die Krusten vom anhaftenden Agar sorgfältig gereinigt. Je 20 Krusten wurden in Erde und in gewaschenem Flussand oberflächlich begraben, in der Erwartung, dass sie auf diese Weise *Rozites*-Hute bilden würden. Dies war aber keineswegs der Fall. Die Pilzmassen waren schon nach wenigen Tagen vollständig verfault.

Der Versuch wurde nun mit neuen Kulturen wiederholt. Dieses Mal wurden aber die Krusten, nachdem sie sorgfältig

vom anhaftenden Agar gesäubert waren, 10-15 Minuten lang in fließendem Leitungswasser ausgespült und darauf auf kurz zuvor gewaschenen Sand gebracht. Die Krusten wurden dieses Mal nur zur Hälfte eingegraben. Die freien Krustenteile bedeckten sich nun sofort mit einem feinen weissen Flaum von Pilzfäden. Nach einer Woche waren aber auch diese Pilzmassen völlig verfault. Es scheint also, dass auch die Krustenform in der freien Natur nicht mehr bestehen kann, sondern unbedingt die Versorgung durch die Ameisen benötigt. Hiermit stimmt die Tatsache überein, dass sowohl Möller als auch Autuori und wir selber die *Rozites*-Hüte auf lebenden, von Ameisen bevölkerten Gärten gefunden haben, niemals ausserhalb.

Wir brachten auch einige dieser Krusten in die künstlichen Kulturen in den Blumentöpfen und stellten sie neben die Gärten. Die Ameisen begannen bald, diese Krusten abzubrechen und über den Rand des Topfes ins Wasser zu werfen. Den Rest bedeckten sie mit einer dicken Lage Erde, die den Boden der Töpfe bedeckte und machten ihn auf diese Weise unschädlich.

Die Krusten von *Atta cephalotes* und *Atta sexdens* zeigten auf Nähragar einen konstanten, jedoch unbedeutenden Unterschied in der Wuchsform, wie das oft bei verschiedenen Stämmen ein und derselben Pilzart vorkommt. In der Conidienform konnten wir aber keine sicher wahrnehmbaren Unterschiede entdecken.

Es ist bemerkenswert, dass wir die Conidienform nur aus den Pilzgärten zuchten konnten, nicht aus den Krusten und dem Hutstiel. Auch Möller berichtet, dass er die starke Conidienform aus den erhärteten Pilzgärten züchtete, vom Hutgewebe schreibt er aber nichts. Da er ausdrücklich die erhärteten Pilzgärten, die noch Kohlrabihäufchen tragen, erwähnt, nicht aber das Hutgewebe, halten wir es für wahrscheinlich, dass seine Versuche mit Hutgewebe ebenfalls nicht zur Bildung der Conidienform führten, dass ihm die Versuche aber zu wenig umfangreich schienen, um sie zu erwähnen.

Oliveira Filho schreibt in seiner Anleitung zur Bekämpfung der Blattschneiderameisen (pag. 3): "Temos dispensado nossa melhor atenção (sem termos até agora conseguido resultados praticos) a um fungo que, na natureza, occasionalmente invade as esponjas dos formigueiros, perturbando a vegetação do fungo cultivado pelas formigas."

Wir wissen nicht, welchen Pilz Oliveira Filho im Auge hat. Es können damit die weissen Krusten und Knollen gemeint sein, die der Bildung von *Rozites*-Hüten vorausgehen oder aber die Conidienform, deren Auftreten die völlige Zerstörung des Pilzgartens zur Folge hat. Beide Pilze sind aber nur Wuchsformen des Gartenpilzes, die durch die Ameisen normaler Weise als schädliche Auswüchse ihres Gemüsegar-

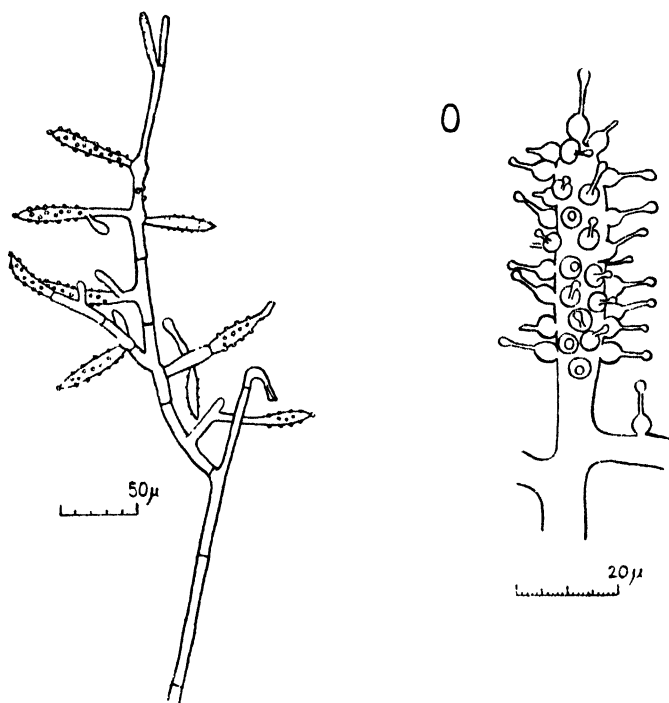


Fig. 8 Die starke Conidienform des Nestpilzes von *Atta seneciensis*

tens unterdrückt werden, und zwar die ersteren durch die mittleren und grösseren Arbeiter, die zweiten durch die kleinsten Gartenameisen.

Es dürfte sich hier also nicht um einen Pilz handeln «que occasionalmente invade as esponjas», sondern um die Tatsache, dass die Ameisen aus diesem oder jenem Grund ihre Kulturen nicht genügend unterhalten und zurückschneiden konnten.

Es scheint uns darum nützlich, von beiden Formen Abbildungen zu geben (Taf. 18 u. 19; Fig. 8), um die Bestimmung der für die Pilzgärten schädlichen Wuchsformen des Kohlrabipilzes zu erleichtern. Eine sehr ausführliche Beschreibung

der verschiedenen Formen des *Atta*-pilzes gibt Möller, auf die wir hiermit verweisen.

Die Angaben von Spengazzini, Bruch und Weber (zitiert nach Weber), denen zufolge Pilze wie *Locellina mazzuchii*, *Xylaria mucrura*, *Promopsis bruchi* und *Lentinus atticulus*, die Hauptfruktifikation des Nestpilzes bilden, sind völlig wertlos und unbegründet, keiner hat den Beweis geliefert, dass diese Fruktifikationen wirklich zum Nestpilz gehören. Allein dann wenn man aus den Sporen oder aus dem Gewebe des Fruchtkörpers das gleiche Mycelium erhält, wie aus den Kohlrabihäufchen allein dann hat man das Recht einen Pilz als Hauptfruktifikation des Nestpilzes zu bezeichnen.

Es ist bemerkenswert, dass sowohl Spengazzini als auch Bruch (zitiert nach Weber) auf alten Nestern von *Acromyrmex lundii* die Fruchtkörper einer *Xylaria* fanden. Auch wir konnten aus verbrauchten alten Pilzgärten wiederholt eine *Xylaria* züchten die auf Agar selbst in Reagenzgläsern reichlich fruktifiziert. Da auch auf alten Pilzgärten der asiatischen Termiten häufig eine *Xylaria* (*X. nigrescens*) fruktifiziert, während der Nestpilz selber zu *Nohoria eurhiza*, einem der *Rozites gongylophora* ähnlichen Basidiomyceten gehört, dürfte *Xylaria* allgemein als Folgepilz in alten Pilzgärten auftreten.

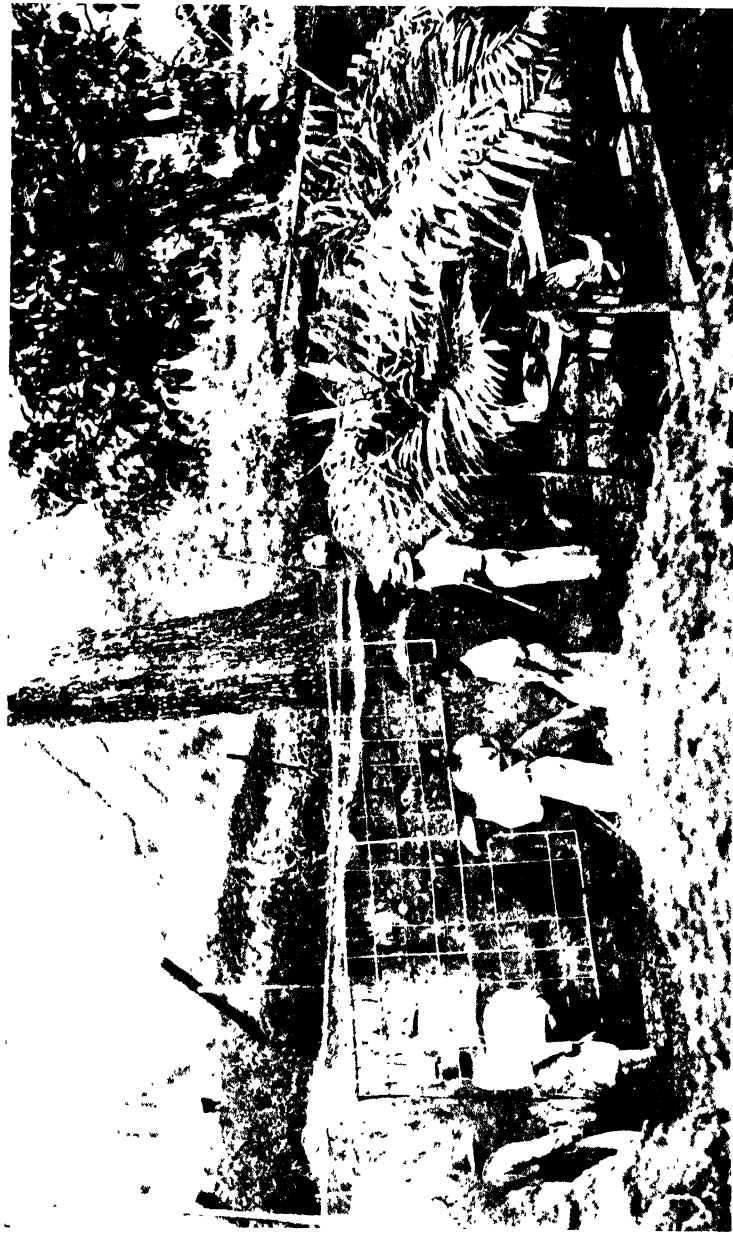
Während die *Nohoria* der Termiten-Nester so häufig und reichlich fruktifiziert, dass deren Hute, wie Patch berichtet (zitiert nach Hegh), der Bevölkerung als Speispilz dienen, wissen die *Atta*-Ameisen die Bildung der *Rozites* Hute weitgehend zu unterdrücken, weshalb diese nur sehr selten zur Entwicklung kommen.

### Fütterungsversuche mit Kohlrabihäufchen aus Reinkulturen

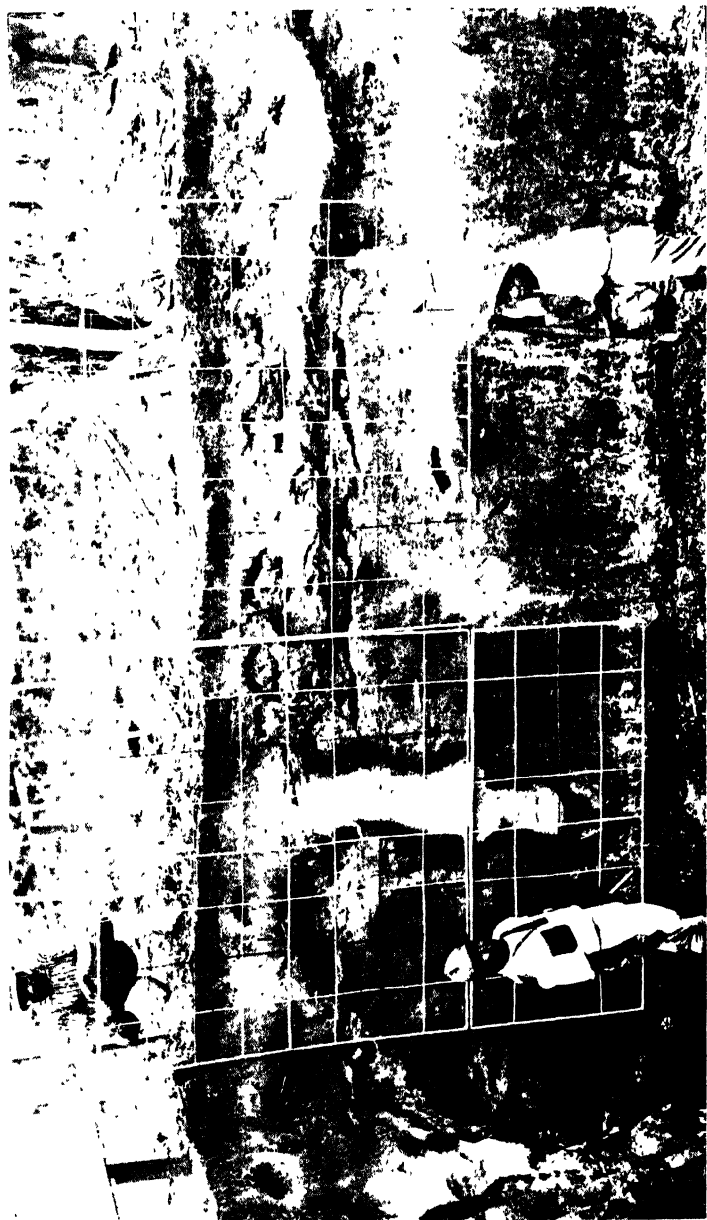
Mit den Kohlrabihäufchen der Reinkulturen aus dem Stiel des *Rozites* Hutes, der auf dem *cephalotes* Nest gefunden wurde, wurden sowohl mit *Atta cephalotes*, als auch mit *Atta sexdens* Fütterungsversuche angestellt.

Zwei Blumentöpfe, halb mit Sand gefüllt, wurden in Schüsseln mit Wasser gestellt. Hierin wurden je etwa 60 *sexdens*-Arbeiter von verschiedener Grösse gebracht. Vom dritten Tage an wurden die Ameisen des einen Topfes 2mal täglich gefüttert, während die des zweiten ungetutet blieben. Schon nach 6 Tagen fanden wir einige tote Tiere bei den nicht gefütterten Ameisen. Am achten Tage war schon die Hälfte tot. Nach 10 Tagen waren noch 4, nach 11 Tagen war nur noch ein einziger Arbeiter übrig, der erst am 18. Tage starb.

Während dieser Zeit waren die gefütterten *sexdens*-Ameisen gesund geblieben und holten täglich 2mal ihre Futterration von der Platinmidei weg.



Nest von *Atta cephalotes* in Paramaribo, ein Profil durch das Abwärtige, im rechts der eine der horizontalen Orientierungsbildern



Nest von *Atta-deas* bei Ledydorp, ein Profil durch das Nestgebiet mit einer ehemaligen Pfahlwurzel, deren Stelle nun durch den weissen Oberflächensand ausgefüllt ist; links der eine der beiden horizontale Orientierungsbalken.



Links Pilzkammer mit 3 Fruchtkörperanfangen des Nestplatzes im Jungnest von *Atta cephalotes* im Kulturgarten. rechts einer der Fruchtkörperanfange





Kraften und Knollenform des Nestplatzes



Die "starke" Condientform des Nestpilzes einen Tag vor der Braunfäung der Sporen



Danach wurde der gleiche Versuch mit je etwa 100 *cephalotes*-Ameisen von verschiedener Grösse wiederholt. Von den nicht gefütterten war nach 13 Tagen die Hälfte tot und zwar hauptsächlich die kleineren Formen. Nach 15 Tagen waren noch 10, nach 17 Tagen noch 5 und nach 19 Tagen noch 4 Arbeiter übrig, worunter 1 Soldat.

Einer dieser Arbeiter wurde nun entfernt und in einen anderen Topf mit feuchtem Sand gebracht. Er konnte kaum noch gehen und hatte zuerst nicht das geringste Interesse

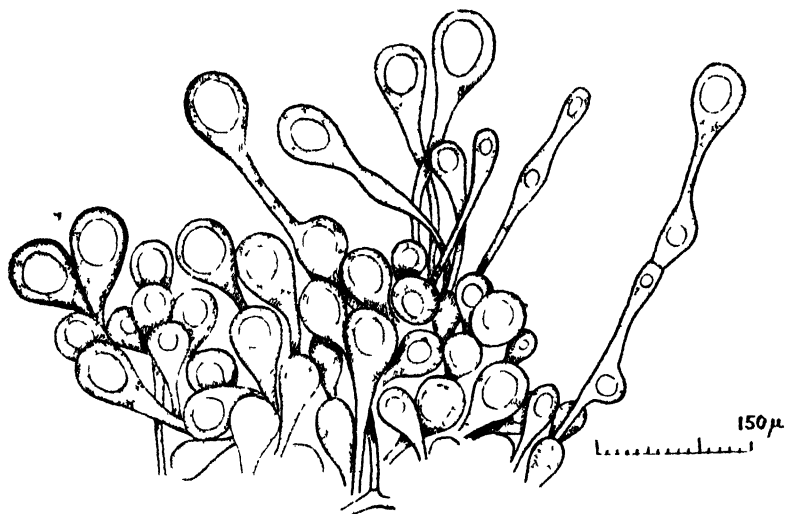


Fig. 9. Kohlrabihäufchen des *sericans* Pilzes aus einer Kultur auf neutralem Rosinen Peptonagar, jedes Köpfchen mit einer Vakuole

für die ihm hingelegten Kohlrabihäufchen. Erst nach einigen Minuten begann er, diese zu betasten und später aufzuessen. Am nächsten, also 20. Tage, waren die beiden nicht gefütterten Arbeiter tot, nur der Soldat war noch am Leben. Der gefütterte Arbeiter aber war wieder ganz normal und nahm gierig die angebotenen Kohlrabihäufchen von der Platinnadel in Empfang. Der Soldat starb erst am 27. Tage.

Schon nach 14 Tagen hatten die gefütterten *cephalotes*-Ameisen begonnen, eine kleine, 2 cm tiefe Grube in den Sand zu graben, worin sie die überschüssigen Kohlrabihäufchen brachten, die sie wie einen Pilzgarten pflegten. Wir brachten darum von nun an täglich ein frisches Citrusblatt in den Topf, von dem die Ameisen sofort kleine Stücke wegschnitten und damit einen kleinen, ganz normalen Pilzgarten aufbauten, in dem

sie kleine Blattstücklein zwischen, die Kohlrabihäufchen einbauten.

Somit war also aus dem Micelium des *Rozites*-Hutstieles wieder ein ganz normaler Pilzgarten entstanden, ein weiterer Beweis dafür, dass der gefundene Hutzpilz wirklich die Hauptfruktifikation des Nestpilzes ist.

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## Notas entomológicas da Baía. VII.

por Gregório Bondar

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(Com 18 figuras)

### S u m a r i o

#### I. Terceira nota sobre a biologia de *Humatidium nerai* Bondar

- 1) Estragos causados em outras palmeiras
- 2) Estragos causados no dendezeiro

#### II. Duas espécies novas de *Humatidium* (Col. Chrysom.)

- 1) *Humatidium moulleti*, n. sp.
- 2) *Humatidium jactat*, n. sp.

#### III. Novos Curculionídeos das flores de palmeiras

##### A) Tribu Derelomini

##### 1) Genero *Derelomus*

- a) *Derelomus sternconius*, n. sp.
- b) *Derelomus tatariae*, n. sp.
- c) *Derelomus mariae-helenae*, n. sp.

##### 2) Genero *Everges* Schonh.

a) *Everges Faldermanni* Boh.

## B) Tribu Hoplorrhini

1) Genero *Hoplorrhinus*

- a) *Hoplorrhinus copioabae* Hust.
- b) *Hoplorrhinus hastachei*, n. sp.
- c) *Hoplorrhinus platythorax*, n. sp.
- d) *Hoplorrhinus fariat*, n. sp.
- e) *Hoplorrhinus dahlgreni*, n. sp.

2) Genero *Phytotribus*

- a) *Phytotribus andraeae*, n. sp.
- b) *Phytotribus pindobae* n. sp.

## C) Subfamília Petalochilinae

1) Genero *Ancylorrhynchus* Germ. et Har.

- a) *Ancylorrhynchus botryophorae*, n. sp.

2) Genero *Balanophagus* Schönh.

- a) *Balanophagus fernando-costae*, n. sp.

## D) Subfamília Barinae

1) Genero *Microstrates* Lac.

- a) *Microstrates bondi* n. sp.
- b) *Microstrates cocois*, n. sp.

IV. Um bruchídeo novo do genero *Pachymerus*1) *Pachymerus diosptosi* n. sp.

As pragas das nossas palmeiras constituem um assunto praticamente inesgotável para as pesquisas entomológicas. Ultimamente, tivemos ocasião de verificar a existência de várias espécies novas e de ampliar os conhecimentos da biologia de espécies já conhecidas. No presente estudo ocupamos de diversos coleópteros das famílias Chrysomelidae e Curculionidae. Acrescentamos no fim uma nova espécie de Bruchídeo, praga de sementes.

I. Terceira nota sobre a biologia de *Himatidium neivai* Bond.

Na Parte V das nossas «Notas entomológicas da Baía» descrevemos uma nova praga do coqueiro, *Himatidium neivai*, que descasca os frutos do coqueiro anão. Na Parte VI das mesmas «Notas» demos informações complementares sobre as plantas nativas brasileiras em que, normalmente, o inseto se cria. Apontamos a palmeira pati (*Cocos botryophora* Mart.) como planta de seiva do inseto.

## 1. Estragos causados em outras palmeiras

Tivemos oportunidade, posteriormente, de verificar que *Himatidium neivai* Bondar é um inseto muito propagado em todo o Recôncavo da Baía, e que se cria especialmente em palmeiras da subfamília Bactridae, nos gêneros *Bactris* e *Desmoncus*. Nessas palmeiras, o inseto se cria as vezes em gran-

de número, alimentando-se as larvas e os adultos no ôlho da planta, na base dos folíolos, nos pecíolos das folhas, e mesmo no tronco. Tanto os pecíolos como os caules, nesses gêneros, são fortemente aculeados. Os acúleos são bastante distantes, de maneira que as larvas e os adultos podem movimentar-se entre êles, comendo a epiderme da planta, que sempre se apresenta fortemente carcomida.

As larvas não procuram abrigo para passarem a ninfas, pouco se incomodando mesmo com os raios solares. Os acúleos oferecem ao inseto defesa eficiente contra as lagartixas e pássaros insetívoros, podendo êle ser alcançado apenas pelos hymenopteros parasitas.

*Himatidium neivai* é especialmente comum em *Desmoncus polyanthoacanthos* Mart. ou «titára» e *Bactris* sp. ou «ticum» Observámos o inseto nos municípios de Aratuípe, Nazaré, Capital da Baía, Camassari, etc. Temos razões para suspeitar da existência dêsse inseto em todo o Brasil, onde crescem estas palmeiras. Assim em qualquer parte do Brasil o coqueiro anão estará igualmente sujeito aos ataques de *Himatidium neivai* e, para defesa de sua cultura será necessário tomar, desde logo, medidas contra êsse inseto, sem o que a cultura do coqueiro entre nós, poderá falhar por completo, como ultimamente verificamos na Estação Experimental de Agua Preta.

## 2. Estragos causados no dendezeiro

O dendezeiro (*Elaeis guineensis* L.), como produtor de óleo, é uma das plantas de maior relevo mundial. De origem africana, essa palmeira foi importada na Baía com os escravos.

Suas aptidões como produtora de óleo, foram devidamente apreciadas pelos lavradores baianos. Na ilha de Itaparica e em todo o Recôncavo e litoral sul-baiano, plantaram-se centenas de milhares de dendezeiros devidamente alinhados, para a exploração racional. Há anos passados, existiam pequenos engenhos para a extração mecanizada do óleo.

É difícil dizer de quando datam as primeiras plantações do dendezeiro na Baía Frei Vicente do Salvador, na sua «História do Brasil» (1627), falando das riquezas naturais da terra, exclama: «Azeite? - faz-se de cocos de palmeira». F. C. Hoehne, na sua «História do Brasil» (século XVI, S. Paulo, 1937) admite que se trata, no caso, do dendezeiro (*Elaeis guineensis*). Não concordamos com essa suposição, pois o mesmo Frei Vicente, referindo-se às palmeiras nativas, escreveu:

«Ha muitas castas de palmeiras, de que se comem os palmitos e o fruto, que são huns cachos de cocos, e se faz delles azeite para comer, e para candêa, e das palmas se cobrem as casas».

Até agora, em todo o interior da Baía, extrai-se azeite de várias palmeiras para usos caseiros, inclusive o culinário. São elas: piassava, pindobassú, andaia, naia licuri, burí, patí, etc.

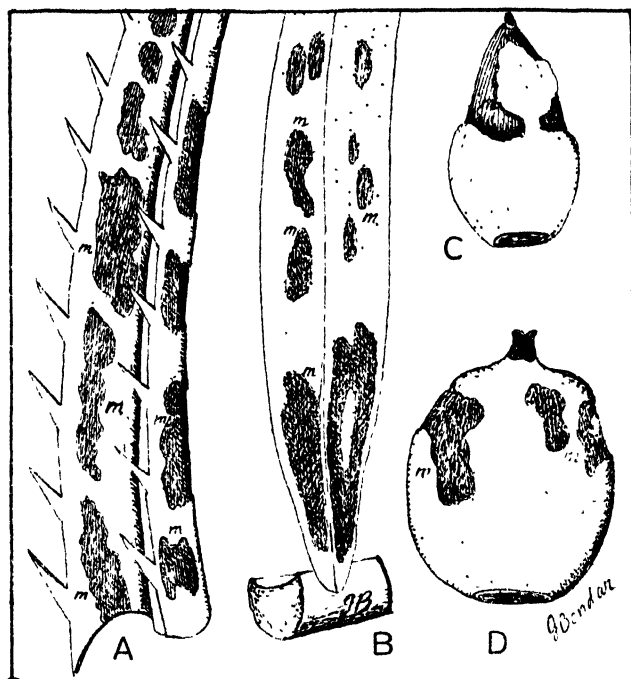


Fig. 1. Estragos causados por *Lissaulidium neri* Bondar no dendezeiro; m, manchas da cuticula caremada pelas larvas e pelos adultos; A, pecíolo da folha; B, pagina inferior do folíolo; C, fruto abortado, tendo sido desenhado quando ainda novo; D, fruto atacado quando já desenvolvido. (G. Bondar del.)

O dendezeiro despertou pouca atenção entre os primeiros historiadores do Brasil e nenhum deles menciona essa palmeira. Iniciou-se a cultura regular do dendezeiro na Baía, provavelmente, no século dezoito. As plantações abandonadas que pudemos observar no Recôncavo, feitas com alinhamentos e distâncias, datam de 60 a 100 anos. Se existiam mais antigas, já desapareceram pela velhice das árvores.

Presentemente, na Baía há vestígios de antigas culturas numa dezena de municípios do Recôncavo e no litoral próximo à Capital. Há mais de uma dezena de milhões de dendezeiros, 99 % no estado sub-espontâneo, plantados pelos urubús. Não há cultura racional. A indústria de azeite não progrediu, antes decresceu. Há pequenas indústrias caseiras que preparam poucas latas ou garrafas de «azeite de cheiro» ou «azeite de dentê» que aparecem no comércio local baiano, sem tomar vulto na economia do Estado. Além de abastecer o mercado



da Baía, o azeite de dendê exporta-se em pequena escala para outros Estados do Brasil, numa média de 70 toneladas, no valor comercial de 140 contos por ano! Uma lavoura iniciada com entusiasmo há mais de um século, não foi avante.

Nas Índias Holandezas, iniciou-se em 1911 a plantação do dendezeiro. Em 1930, a área coberta com esta palmeira já era de 62.000 hectares, sendo muitas plantações novas. A exportação de óleo, no mesmo ano, era de mais de 60.000 toneladas.

As observações provaram que a plantação nova de 3-4 anos produz uma tonelada de óleo por hectare e por ano, aumentando progressivamente a produção até 10-15 anos, ficando então estabilizada, atingindo duas e três toneladas de óleo por hectare. Admitindo-se o preço de 2 mil réis por quilo de óleo, podemos calcular a renda bruta por hectare em 4-6 contos de réis. Adicione-se a isso ainda o preço dos subprodutos, como torta da amêndoa, muito procurada para a indústria dos laticínios, e como ótima forragem.

Poucas plantas culturais têm essa capacidade produtiva.

Por que, então, uma cultura tão rendosa em outros países, falhou por completo na Baía?

As causas são diversas. Uma delas é o *Himatidium neivai* Bondar, inseto que pulula em todos os dendezaís do Recôncavo, espécie nova para a ciência entomológica, que ultimamente descrevemos, como praga do coqueiro. Em todos os municípios do Recôncavo, que visitamos, examinando os dendezeiros, sempre verificamos a presença do inseto. Nas plantas novas, o bicho, larvas e adultos, criam-se no olho, descascando a epiderme dos pecíolos foliares e os folíolos. Nos dendezeiros em produção, o inseto localiza-se, de preferência, nos cachos de frutos, descascando-os. Os frutinhas descascados quando novos, não se desenvolvem, os cachos abortam; ninguém os colhe pois não têm serventia alguma. Os frutos, atacados quando já desenvolvidos, perdem de metade a dois terços de seu teor em óleo. Há palmeiras, muito atacadas, cujos cachos, na totalidade, aparecem abortados.

Nos frutos atacados, o endocarpo e amêndoa acham-se mediodremente desenvolvidos, acompanhados apenas de fibras secas, sem nenhuma polpa oleosa, pois a epiderme protetora ficou destruída pelo inseto.

Encontram-se também cachos um tanto carcomidos, que ainda se aproveitam, apesar de pobres em óleo. Aproximadamente a décima parte dos cachos está em estado mais ou menos perfeito. Mas é apenas um decimo daquilo que o palmeiral normalmente deveria produzir.

Consideramos o *Himatidium neivai* Bondar, uma das principais causas do insucesso da cultura do dendezeiro na Baía,

Presentemente, o Governo do Estado da Baía, que presta a devida atenção ao dendezeiro, adquiriu um maquinário moderno, para extração de óleo da polpa e da amendoa; mantém uma Estação Experimental, onde estão racionalmente plantados vários milheiros de pés de dendê. Com os conhecimentos atuais da nova praga, julgamos que esta cultura, entre nós, só poderá ter êxito sob a condição de se manterem as devidas medidas de defesa contra as pragas.

Uma das primeiras medidas será a eliminação nas vizinhanças, das palmeiras nativas (titára, ticum e patí), seguida de vigilância e tratos curativos, quando necessários.

Além do *Himatidium*, encontram-se no dendezeiro outras pragas: *Rhina barbirostris* e *Rhynchophorus palmarum*, que atacam os troncos de dendezeiro quando avariados pelo fogo e outros acidentes. *Laphrocerus cocois* desenvolve-se nos folíolos. *Parasoschoenus obesulus* cria-se na polpa dos frutos. Nas flores masculinas, cria-se *Derelomus elaeisae* Hust.

Para o dendezeiro, como para o coqueiro anão, o inseto passa de nossas palmeiras nativas (patí, titára e ticum), onde normalmente se cria.

São fáceis as medidas de defesa. As larvas e adultos vivem e alimentam-se externamente no fruto e é fácil atingi-los com pulverizações inseticidas.

## II. Duas espécies novas de *Himatidium*

Na Parte VI das nossas «Notas entomológicas da Baía fizemos algumas considerações a respeito deste genero de Hispíneos, antigamente incluído nos Cassidíneos, e acrescentámos a descrição de uma espécie nova. Agora podemos tornar conhecidas mais duas espécies, que igualmente nos parecem novas.

### 1) *Himatidium mauliki*, n. sp.

Vermelho-unicolor, brilhante; olhos e antenas, excepto o primeiro segmento, pretos; segmento basal vermelho, chato; configuração elíptica, cerca de 3 vezes mais comprido do que largo; margens subparalelas.

Cabeça lisa, brilhante, com pontilhações finais; na região occipital, ao meio, uma covinha rasa, às vezes alongada para a frente; fronte lisa, sem corno interantenal. Antenas com o segmento basal duas vezes mais comprido do que largo, segmento segundo curto, de comprimento subigual à

grossura; terceiro menos de duas vezes mais comprido do que o segundo; segmentos posteriores de comprimento subigual á grossura.

Pronoto na base pouco mais estreito do que a base dos elitros, ligeiramente dilatado para a frente, margem lisa, um tanto revirada para cima; base sinuosa, não acompanhada pelo sulco submarginal; ângulos latero-posteriores subretos, não alongados em espinhos; dorso brilhante, pontilhações finais; às vezes há uma ou duas covinhas maiores rasas no meio dos lados. Escudo pentagonal, liso, mais largo que comprido.

Elitros arredondados na base, conjuntamente arredondados no ápice, bordos laterais subparalelos, lisos, não denticulados posteriormente; comprimento mais de duas vezes maior do que a largura; em cada elitro cerca de 12 estrias longitudinais, formadas pelas covinhas, assaz fundas; a primeira estria sutural termina no 1.º terço, atrás do escudo.

Patas e abdomen vermelhos, concolores, anéis abdominais lisos, brilhantes. Compr. de 5 a 6 mm., largura de 2 a 2,5 mm.

Alimenta-se nas inflorescências, na face interna das espátas vermelhas de *Heliconia brasiliensis* (Musaceae), Município de Cachoeira, Est. da Baía. Coligido pelo autor em 5-5-1940. Descrito sobre abundante material.

Tipo na coleção do autor, cotipos no British Museum (Natural History), London.

A larva é branca, chata, de configuração elíptica, de margem contínua, lisa, cabeça escondida debaixo do primeiro anel torácico, prolongado para a frente; mais pigmentada do que o resto do corpo. Patas claras. Compr. 6,5 mm., larg. 3,5 mm. Vive nas espátas das inflorescências, protegida pelas flôres e frutos de *Heliconia brasiliensis*. Nesses abrigos, formam-se as ninfas.

Difere a espécie das anteriormente descritas pelo conjunto dos caracteres das antenas, configuração e colorido do corpo. Na chave das espécies de *Spaeth*, ela entra no primeiro grupo do subgênero *Himatidium* s. st.

Dedicamos a espécie ao Prof. S. Maulik em reconhecimento do valioso auxílio que nos prestou no estudo dos Hispíneos brasileiros.

## 2) *Himatidium spaethi*, n. sp.

Corpo alongado subelíptico, cerca de três vezes mais comprido do que largo, preto-azulado, metálico; elitros azul-esverdeados, com brilho metálico; pronoto vermelho; cabeça e antenas uniformemente pretos.

Cabeça lisa, sem a crista interantenal. Antenas pouco separadas; o primeiro segmento grosso; o segundo, fino e curto, de compr. igual á grossura; o terceiro, cerca de tres vezes mais comprido do que o segundo; os ulteriores, progressivamente mais curtos.

Pronoto da largura dos elytros; mais largo do que comprido, vermelho; bordo anterior, atras da cabeça, largamente dilatado, azulado-enfumado; base pouco encurvada, quasi réta excepção nas extremidades, viradas para traz; acompanhada de um sulco submarginal fino; azulado-enfumado na frente do escudo e nos ângulos látero-posteriores, virados para tras em forma de espinho; bordos laterais subparalelos, ligeiramente convergindo para a frente, separados da submargem pelo sulco fino, revirados para cima; lado ventral amarelo nas margens, preto-azulado no terço mediano; pontilhações do dorso esparsas, finas, rasas. Escudo pentagonal, mais largo do que comprido, liso.

Elitros com os bordos laterais paralelos, lisos em três quartos, espaço dentilhado no quarto apical; mais de duas vezes mais compridos do que largos; estrias longitudinais rasas, formadas pelas pontilhações separadas, pouco fundas, sem formar sulcos; a primeira estria sutural completa, chegando até o ápice do elitro; bordos laterais estreitos, ligeiramente revirados para cima.

Patas pretas, tarsos ligeiramente amarelados na face inferior. Abdomen liso, com brilho metálico-azulado.

Compr. 6 mm., largura 2,8 mm.

Cria-se em tufos de uma Gramínea agreste, arenícola, de folhas finas, com caules floríferos duplos; espécie não identificada.

Coligido pelo autor em Pituba, arredores da Baía, em 12/5/940.

Descrito sobre 14 exemplares.

Tipo na coleção do autor.

Pertence a especie ao subgênero *Parimatidium* Spaeth Difere das quatro especies conhecidas deste subgênero pela conformação do corpo, colorido do pronoto, antenas e patas.

Dedicamos a especie ao Prof. Franz Spaeth, Viena, como signal de gratidão pelo inestimavel serviço com a classificação dos Cassidíneos da nossa coleção e cuja monografia sobre *Himatidium* nos habilitou a descrever novas especies.

### III. Novos Curculionídeos das flores de palmeiras

#### Subfamília *Erirrhinae*

#### A) Tribu *Derelomini*

Lacordaire, na sua obra «Histoire Naturelle des Insectes. Genera de Coleoptères», tomo 7, incluiu os Derelomíneos na cohorte dos Apostasimerídeos, na primeira falange das espécies com clava antenal articulada e o terceiro segmento dos tarsos bilobado, na primeira subdivisão com os epímeros mesotorácicos não ascendentes, no grupo com antenas geniculadas.

E. Voss (Über ostasiatische Curculioniden. Senckenbergiana, vol. 19, 1937) aproxima os Derelomíneos á Subfamília Trypetinae, que figura na obra de Lacordaire ao lado dos Derelomíneos, com a diferença de possuir o rostro não cilíndrico.

A. Klima, no «Coleopterorum Catalogus» de W. Junk (Pars 140, Curculionidae: Erirrhinae, 1934) inclúe os Derelomíneos como tribu na subfamília dos Erirrhíneos, que Lacordaire incluiu na cohorte dos Synmerídeos.

Caracterisa-se a subfamília *Erirrhinae* pelas antenas geniculadas, coxas juntas, pygidio encoberto, unhas livres, não apendiculadas, metasterno alongado, corbelhas das tíbias abertas posteriormente.

A vacilação dos diversos autores em precisar a posição sistemática dos Derelomíneos, mostra a variabilidade das espécies.

Conforme o catálogo de Klima, a tribu *Derelomini* contém presentemente 17 géneros, com 96 espécies. O grosso dos géneros e espécies é do continente africano e asiático. Na América figuram representantes de oito géneros. Para o Brasil, são registradas apenas três espécies, que entram em três géneros diversos: *Derelomus avicularis* Boh. (1844), *Everges Valdermanni* Boh. (1844), e *Phyllotrox semirufus* Boh. (1843).

A biologia das três espécies é desconhecida.

#### 1) Género *Derelomus* Schönh.

Em nossa série de «Notas Entomológicas da Baía», parte V, mencionamos *Derelomus argentinensis* Hustache e demos a biologia de *Derelomus bondari* Hust. 1940, cujas larvas se desenvolvem nas flores masculinas de *Cocos coronata* Mart.

e *Cocos nucifera* L., completando o ciclo evolutivo dentro das flores. Verificámos que esta espécie se desenvolve também em flores masculinas de patí (*Cocos botryophora* Mart.) Posteriormente achámos mais uma espécie nova, *Derelomus elaeisae* Hust. 1940, cujas larvas se desenvolvem nas flôres masculinas de dendezeiro, *Elaeis guineensis* L., palmeira africana, importada no Brasil. Com toda a certeza, o inseto pulula nas inflorescências masculinas, podendo-se apanhar vários milhares em uma inflorescência. Em cada flôr masculina criam-se 2-4 indivíduos, comendo anteras e filamentos.

As duas espécies brasileiras de *Derelomus*, cuja biologia conhecemos, criam-se em flores masculinas de palmeiras. É muito provável que todas as 31 espécies deste gênero, registradas no *Coleopterorum Catalogus* de Klima, tenham o mesmo regimen.

Conduz-nos essa generalização às seguintes conclusões:

1) Os Derelomíneos, por falta dos devidos estudos, são pouco conhecidos nas coleções entomológicas e na literatura brasileira.

2) Esses insetos, destruindo o polen das flôres masculinas, esterilizam as flôres, prejudicando a frutificação das palmeiras úteis, como coqueiro, dendezeiro, licuriseiro etc. Por esta razão seu estudo tem interesse econômico.

3) O Brasil possui dezenas de gêneros e centenas de espécies de palmeiras. Deve possuir numerosos representantes dos Derelomíneos, insetos até agora desconhecidos, por falta de investigações orientadas para o conhecimento da nossa fauna entomológica.

4) A adoção da hipótese sobre generalização do regimen alimentício dos Derelomíneos, facilitará aos naturalistas brasileiros as investigações para atualizar os nossos conhecimentos sobre a biologia das flôres de palmeiras, com a investigação de seus parasitas, para o melhor conhecimento das causas da falta de produção das palmeiras.

Guiados pela hipótese referida, investigámos as inflorescências de várias espécies e gêneros de palmeiras e enriquecemos as nossas coleções de Derelomíneos com várias espécies, que julgamos novas e passamos a descrever.

a) *Derelomus sternicornis*, n. sp.

Oblongo, estreitando-se para a frente; glabro; bruno-enfumado, cabeça avermelhada; antenas, abdomen e patas testáceos. Dimorfismo sexual pronunciado.

Fêmea. — Rostro píceo, mais claro no ápice, fino, glabro, liso, cilíndrico, alargado na ponta, comprido, pouco arqueado, dirigido para a frente. Antenas no meio do rosto,

ruivas; escapo liso, engrossado na metade distal, atingindo o olho; funículo de 7 segmentos: o primeiro glabro, quasi duas vezes mais comprido do que o segundo; clavado no ápice: o segundo um pouco mais comprido do que o terceiro e quarto juntos, com poucos pêlos na metade apical; segmentos 3-7 subiguais em comprimento, alargando-se progressivamente, esparso-pilosos. Clava pilosa, de 3 segmentos subiguais; o primeiro trapeziforme, de largura igual ao comprimento; o segundo de comprimento pouco maior que a largura, lados arqueados, base e ápice subiguais; o terceiro pouco separado do segundo, soldado, cônico, mais comprido do que largo. O comprimento do rostró, juntamente com a cabeça, é igual ao do corpo. Cabeça cônica, globosa na base do lado ventral, lisa, chagrinada com malhas finissimas. Olhos pretos, alongados, laterais, planos, separados na frente pela crista larga e baixa que é a continuação do rostró. Ocelos grossos

Protorax de comprimento subigual à largura, de um terço do comprimento do corpo; pronoto trapeziforme, base reta, ângulos posteriores subretos; lados pouco arredondados; na frente um curto colo; glabro, liso; pontilhações finas, esparsas, mais densas no colo. Prosterno globoso no centro, na frente das coxas. Escudo pequeno, subquadrado, enfumado.

Elitros brúnos; base reta, lados ligeiramente curvados; em conjunto duas vezes mais compridos do que largos; superfície glabra, lisa, lucente; pontilhões finas, arredondadas, alinhadas em nove estrias, sem formar sulcos unidos.

Patas testáceas; coxas globosas, pequenas, subcontíguas no primeiro par, mais espaçadas no segundo, distantes no terceiro. Femures lisos, glabros; tíbias com pelos e espinhos na margem interna distal, com fortes dentes no ápice em roda da corbelha.

Toda a face ventral amarela, glabra, lisa, covinhas minúsculas.

O tamanho dos indivíduos é variavel; os maiores atingem 6-7 mm. de comprimento (inclusive o rostró), sobre 1,8 a 2 mm. de largura nos elitros; os indivíduos menores têm 3,5 a 4 mm. de comprimento.

Macho de forma, colorido e tamanho igual ao da fêmea. Rostro mais grosso e curto, achatado, piloso no apice; antenas no terço apical; em baixo da base das antenas um dente lateral obtuso. Protorax mais comprido do que a me-

tade dos elytros, mais comprido do que largo. No prosterno, um forte corno preto, largo na base, cônico, recurvando-se para a frente, ultrapassando a cabeça, atingindo a metade do rostro.

Descrito sobre varias centenas de exemplares, apanhados pelo autor nas flores masculinas da palmeira burí (*Diplothemium caudescens* Mart.) na fazenda Copioba, município de Nazaré, Baía, em 20/11/1940.

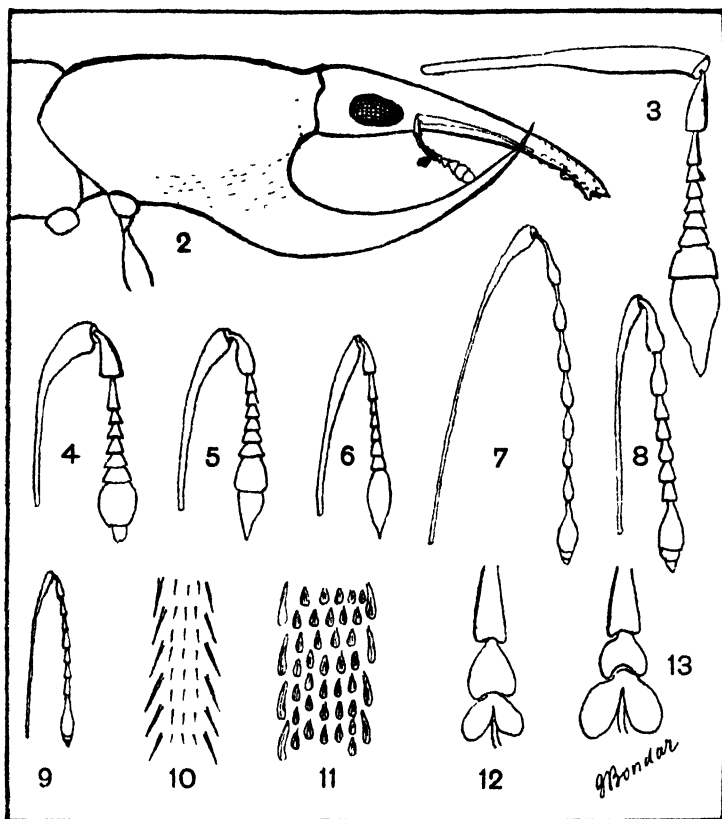


Fig. 2. *Derelomus sternicornis* n. sp., protorax e cabeça, vista lateral. — Fig. 3. *Idem*, antena. — Fig. 4. *Derelomus latianus* n. sp., antena. — Fig. 5. *Derelomus mariar-helenae* n. sp., antena. — Fig. 6. *Derelomus elavisae* Hust., antena. — Fig. 7. *Hoplorrhinus scopioae* Hust., antena. — Fig. 8. *Hoplorrhinus mustachei* n. sp., antena. — Fig. 9. *Hoplorrhinus fariat* n. sp., antena. — Fig. 10. *Phytotribus pindobae* n. sp., escamas aos elytros. — Fig. 11. *Phytotribus andarae* n. sp., *Idem*, — Fig. 12. *Aneulorrhynchus trapezicollis* Hust., tarso. — Fig. 13. *Aneulorrhynchus botryophorae* n. sp., tarso. (G. Bondar del.)

Tipo e paratipo na coleção do autor.

Difere das demais espécies pelo colorido escuro-piceo no dorso, imitando a cor escura das flores da palmeira em que vive.

Devido ao prosterno de macho, a espécie merece um gênero novo. Das espécies de *Derelomus* que conhecemos, esta é a única que os-



tenta este curioso ornamento, de uso desconhecido. Em *Derelomus elaeisae* Hust., o macho tem também a particularidade de possuir no esterno, entre as coxas dianteiras, uma excrescência, em forma de lâmina, estreita na base, larga e trilobada no ápice, dirigida obliquamente para a frente que, observada de lado, dá a impressão de um pequeno cornio.

b) *Derelomus tatianae*, n. sp.

Pequeno, de cor uniforme, testáceo-avermelhada; olhos pretos; rosto fortemente arqueado, dirigido para baixo.

Fêmea. — Rostro relativamente grosso, liso; o comprimento excede o do torax; antenas acima do meio. Escapo liso, engrossado e fortemente recurvado no quarto distal; funículo com poucos cílios, de 7 segmentos; o primeiro cônico, do comprimento dos dois seguintes juntos; 2-5 estreitos; 3-6 moniliformes; e sexto e o sétimo progressivamente alargados. Clava pilosa, de dois segmentos nítidos; o primeiro largo, subgloboso, comprido, o comprimento subigual à largura; o segundo de um terço do comprimento do primeiro e um terço da sua largura. Cabeça globosa, finamente chagrinada, glabra, olhos redondos, espaçados.

Protorax curto, mais comprido do que largo, base reta, lados arredondados, formando um colo na frente; coberto de covinhas hexagonais juntas, mais pronunciadas e alinhadas no coio; cílios minúsculos, partindo do centro das covinhas. Largura pouco menos que a base dos elitros. Escudo pequeno, arredondado no ápice.

Elitros, em conjunto, cerca de duas vezes mais compridos do que largos, pouco arqueados lateralmente, arredondados isoladamente, no ápice; estriados, com 9 fileiras visíveis em cada, formadas de covinhas circulares alinhadas, armadas de cílios no centro, nos intervalos entre as estrias há duas fileiras de cílios, dispostos irregularmente.

Patas com femures lisos, engrossados no meio, tíbias pouco ciliadas, armadas com pequeno dente no ápice.

Esterno com covinhas circulares, espaçadas; anéis abdominais lisos.

Comprimento de 2 a 2,5 mm. (sem o rosto); largura de 0,8 a 1 mm.

Macho difere da fêmea pelo rosto mais grosso, áspero, ciliado; antenas no terço apical.

Descrito sobre numerosos exemplares, apanhados pelo autor nas flores masculinas da palmeira *Attalea junifera* Mart., no município de Nazaré, Baía.

Tipo e paratipo na coleção do autor. A espécie foi remetida ao Prof. A. Hustache sob o N.º 2.671.

Difere das demais espécies pelos caracteres do rostro, antenas, pronoto e elitros.

A espécie foi remetida ao Prof. Hustache para ser descrita. Devido às dificuldades das comunicações, nenhuma notícia recebemos da chegada da remessa, razão por que resolvemos descrevê-la.

A espécie foi dedicada a Tatiana Bondar, filha e colaboradora do autor.

c) *Derelomus maria-c-helenae*, n. sp.

Pequeno, testáceo, olhos pretos. Dimorfismo sexual pouco pronunciado.

Rostro ligeiramente áspero, nos machos coberto de covinhas, antenas no terço distal; nas fêmeas mais liso, antenas na parte mediana; escapo liso, do comprimento do funículo e clava reunidos, pouco encurvado no ápice; primeiro segmento do funículo ovoidal, de comprimento subigual ao segundo e terceiro reunidos; segmentos terceiro ao sétimo subiguais em comprimento, alargando-se progressivamente; clava pilosa, de tres segmentos nítidos, subiguais em comprimento; o primeiro e o segundo trapeziformes, comprimento subigual à largura; o terceiro cônico. Cabeça lisa, covinhas minúsculas, esparsas, providas de cílios; olhos laterais, distantes, subredondos.

Protorax mais comprido do que largo, pouco mais estreito do que os ombros dos elitros; lados arredondados, formando um colo na frente; coberto de covinhas irregulares. Escudo pequeno, subtriangular.

Elitros 1,5 vezes mais compridos do que largos; bordos subparalelos; nove estrias, formadas pelas covinhas circulares, pronunciadas, maiores do que no pronoto, armadas de cílios; nos intervalos há cílios do mesmo tamanho, irregularmente dispostos.

Femures glabros, engrossados no meio; tíbias arqueadas com espinhos e pêlos no ápice e pequeno esporão, desviado.

Esterno com covinhas circulares; abdomen liso.

Comprimento 3 mm., inclusive o rostro; largura 1 mm.

Descrito sobre 15 exemplares, pegados pelo autor em flores masculinas da palmeira butia (*Cocos eriospatha* Mart.), em 10/9/1940, em Florianópolis, Est. de S. Catarina.

Tipo e cotipo na coleção do autor.

Difere das outras espécies pelo rostro pontilhado de covinhas, caracteres das antenas e a superfície do dorso.

Dedicamos a espécie, como presente de formatura, à gentil senhorita Maria-Helena Campos, filha do nosso amigo Mário a cujos bons ofícios devemos a descoberta da espécie no sul do Brasil.

## 2) Gênero *Everges* Schönh.

Conforme o *Coleopterorum Catalogus*, Subf. *Erirrhiniinae* de A. Klima, este gênero da tribo *Derelomini* contém apenas uma espécie, *E. Faldermanni* Boh. 1844, originária do Brasil. Este inseto é uma raridade nas coleções entomológicas brasileiras. Suspeitamos que o inseto se desenvolve nas flores masculinas de palmeiras e que deve haver outras espécies no Brasil.

Do gênero *Derelomus* este gênero diverge pelos femures pedunculados e o corpo mais esguio.

Visto o interesse que o gênero poderá ter na nossa entomologia, traduzimos aqui de Lacordaire os seus caracteres:

«Macho Rostro arqueado, estrobos basilares, muito curtos, retílineos. Antenas basilares, bastante longas e finas; escapo engrossa progressivamente, ultrapassando os olhos, funículo com os segmentos 1-2 alongados, obcônicos, 3-7 curtos, iguais; clava compacta, primeiro segmento inversamente cônico. Olhos grandes, achatados, ovais, transversais. Protorax pouco convexo, suboval, truncado na base, ombros obtuso-angulosos. Patas bastante longas, femures claviformes, pedunculados na base; tíbias finas; tarsos curtos, estreitos, esponjosos, segmentos 1-2 obcônicos, 4.º mediodre, unhas dos tarsos pequenas, divergentes. O segundo segmento abdominal é muito mais longo do que os 3-4 juntos, soldado com o primeiro, separado por uma linha apenas visível, arqueada; saliência entre as coxas larga, arredondada na frente. Metasterno comprido. Saliência mesosternal estreita, inclinada e truncada para traz. Corpo oblongo, quasi glabro. Fêmea Antenas no meio do rostro»

### a) *Everges Faldermanni* Boh.

A única espécie do gênero tem a seguinte descrição:

«Pequeno, preto, brúno, com o rostro, ponta do abdomen e duas manchas nos elitros amarelo-ferrugíneos; uma destas manchas ocupa a base dos elitros e prolonga-se ao longo da sutura, outra é situada fóra do meio e quasi quadrada; ambas são bastante grandes».

Numa inflorescência de gerivá (*Cocos Romanzoffiana* Cham.), em Florianópolis, Est. de S. Catarina, em 10-9-1941, apanhámos 3 exemplares, machos, que identificámos como *Everges Faldermanni* Boh. e que guardamos em nossa coleção.

b) Tribu *Hoplorrhini*

No sistema dos Curculionídeos de Lacordaire, na coorte dos Apostasimerídeos, entra a subfamília *Antliarrhininae*, insetos de rostró comprido, prosterno não canaliculado, clava antenal articulada, terceiro segmento dos tarsos bilobado, antenas retas. Os tres gêneros, com doze espécies conhecidas, provêm do velho continente.

1) Gênero *Hoplorrhinus* Chev.

Em 1878, Chevrolat criou o gênero *Hoplorrhinus* para duas espécies brasileiras e incluiu o gênero na subfamília *Antliarrhininae*, não obstante a divergência observada nas antenas gemculadas.

A. Klima, no *Coleopterorum Catalogus* de W. Junk pars 146, 1936, manteve o gênero na subfamília dos *Antliarrhineos*, nele incluindo quatro espécies sul-americanas.

E. Voss, na sua obra *Ein weiterer Beitrag zur Kenntnis der Curculioniden Javas*, 1936 (?), inclui os *Hoplorrhini* na subfamília *Trypetinae*.

A. Hustache, na sua publicação «Nouveaux *Hoplorrhinus*» (*Rev. Soc. Ent. Argentina*, vol. 6, 1934), obra evidentemente desconhecida a A. Klima por ocasião da elaboração do *Coleopterorum Catalogus*, sugere que se junte o gênero *Hoplorrhinus* aos *Eirrhinídeos* de Lacordaire, formando a tribu *Hoplorrhini*, juntamente com os gêneros *Phytotribus*, *Centemerus* e *Celetes*, todos da América do Sul. Aceitamos essa sugestão. A respeito do gênero *Hoplorrhinus* Hustache escreve:

«Chevrolat a décent son genre visiblement sur le seul sexe mâle et l'a rattaché aux *Antliarrhines* de Lacordaire. G. C. Champion a complété les caractères donnés par Chevrolat et a érigé pour ce seul genre la tribu des *Hoplorrhini*. L'un des caractères génériques donnés est l'absence d'onglet apical aux tibias, ce caractère exact pour la plupart des espèces, souffre cependant une exception remarquable et qui mérite d'être signalée. Dans d'assez nombreux genres le mâle a un petit ongle aux tibias antérieures, et parfois aux intermédiaires et même quelquefois à tous les tibias, alors que la femelle en est dépourvue; chez *H. bimaculatus* les tibias du mâle n'ont pas d'onglet, mais tous ceux de la femelle en sont pourvus et de plus ces ongles sont assez longs, si bien qu'en ne tenant compte que de ce seul caractère on pourrait maintenir le mâle parmi les *Hoplorrhinus* mais en éloigner la femelle! Singulière exception. Le genre semble représenté dans l'Amérique du Sud par d'assez nombreuses espèces».

Em sua publicação, Hustache dá a seguinte lista de espécies de *Hoplorrhinus*, inclusive 4 novas, e sua distribuição pela America:

<i>alternans</i> Hust. 1934	Argentina
<i>bimaculatus</i> Hust. 1929	Brasil, S. Catarina
<i>brevitarsis</i> Hust. 1934	Argentina
<i>cariniceps</i> Hust. 1934	Perú
<i>crispus</i> Champ. (especie duvidosa)	Honduras, Guatemala
<i>geniculatus</i> Chev. 1878	Brasil, S. Catarina
<i>Lizeri</i> Hust. 1923	Bolívia
<i>metanocephalus</i> Chev. 1878	Brasil
<i>mexicanus</i> Champ.	México
<i>tarsalis</i> Hust. 1934	Perú

Todas essas espécies são de biologia desconhecida.

Em 1939, investigando a fauna das flores de palmeiras na Baía, colhemos quatro novas espécies e verificámos que as larvas das mesmas se criam nas espatas internas das inflorescências. Os adultos se alimentam nas flores, comendo polen e a epiderme tenra das pétalas e dos ramos florais. As fêmeas depositam os ovos nas espatas recém-abertas, geralmente do lado interno. As larvas alimentam-se do tecido parenchimatoso, caminhando em galerias, entre as fibras, na direção do ápice. As ninfas e os adultos formam-se dentro de casulos, feitos de goma, na espata. O ciclo evolutivo é de vários meses, correspondendo aproximadamente à duração da maturação dos frutos.

Os *Hoplorrhinus* apanham-se somente nas inflorescências de palmeiras. Fora deste meio, nunca são encontrados. Julgamos que, entre nós, este gênero é numeroso em espécies e merece ser investigado em diversos gêneros de palmeiras. É possível que se descubram muitas novidades entomológicas, para melhor conhecimento da nossa fauna.

Tres espécies nossas, descritas por Hustache, foram divulgadas pela Revista de Entomologia, (vol. 11 e 12, anos 1940-41): a diagnose da quarta, denominada por Hustache, perdeu-se no correio, devido à situação política, razão por que a descrevemos, respeitando o nome dado. São estas:

*Hoplorrhinus bipunctatus* Hust. 1940 Cria-se em *Attalea junifera* Mart., *A. compta* Mart., *A. humilis* Mart. e outras palmeiras do gênero *Attalea*

*H. testaceus* Hust. 1940. Cria-se em palmeiras do gênero *Attalea*.

*H. unicolor* Hust. 1940. Cria-se em palmeiras do gênero *Cocos*: *C. coronata* Mart., *C. boivoyphora* Mart., *C. tostana* Bondar, *C. matafome* Bondar etc.

*H. copiobae* Hustache. Cria-se em *Attalea junifera* Mart., *A. humilis* Mart., *A. compta* Mart. etc. Esta última espécie, cuja diagnose não chegou às nossas mãos, redescreveremos abaixo, dando em seguida a descrição de outras espécies, que julgamos novas.

a) *Hoploirrhinus copiobae*, n. sp. Hustache (in litt.)

Grande, testáceo-uniforme, olhos pretos. Dimorfismo sexual pronunciado. Tamanho muito varável.

Macho. -- Rostro dirigido para a frente, subreto, escuro-avermelhado, do comprimento do protorax, subquadrangular, sulcado longitudinalmente: duas cristas na face frontal mais salientes, providas de 5-6 tubérculos, alongados na base; o aspeto áspero visto de lado; na base dos escrobos o rostro é ligeiramente alargado, os tubérculos são maiores; base do rostro alargada, cônica com covinhas grossas, fortes, que diminuem progressivamente. Escrobos no terço apical, laterais, obliquos. Escapo atingindo os olhos, fino, liso, ligeiramente clavado para o ápice. Funículo progressivamente piloso, de 7 segmentos; 1-4 alongados, progressivamente diminuindo em comprimento e grossura; segmentos 5-7 subiguais. Clava de três segmentos; o basal pedunculado, fino na base, da largura dos precedentes, alargando-se desde o meio, comprido, ocupando tres quartos da clava; o segundo, mais estreito, cerca de 4 vezes mais largo do que comprido; o terceiro, cônico, cerca de 3 vezes mais comprido do que o segundo. Clava finamente sedosa. Cabeça pequena, globosa em baixo; pontilhação fina. Olhos pretos, subredondos, distantes.

Protorax mais comprido do que largo, mais comprido do que a metade dos elitros, mais largo do que os elitros, bruscamente bombeado no dorso atrás da cabeça; um sulco longitudinal na linha mediana dorsal; base bisinuosa, lados fortemente arredondados, estreitando-se para a frente, sem formar colo; pontilhações finas, formadas pelas covinhas circulares; glabro; pêlos minúsculos, esparsos. Escudo pequeno triangular.

Elytros subretos na base, paralelos nos lados em dois terços do comprimento, arredondados em conjunto no ápice; nove estrias nítidas, longitudinais, em cada elitro, formadas pelas fileiras de covinhas elíptico-circulares, vermelhas; intervalos ásperos; pilosidade forte, densa, não alinhada.

Prosterno opaco, glabro. Coxas arredondadas, sub-contíguas, com estria escura na frente. Femures pedunculados, engrossados na segunda metade; um dente forte e outro menor

na margem interna do quarto apical; tíbias finas, recurvadas; um calcanhar grosso, obtuso na face interna do ápice. Os dois primeiros tarsos cônicos, curtos, avermelhados; terceiro bilobado; unhas vermelho-escuras, livres. Mesosterno curto, afundado. Metasterno pouco mais comprido do que os dois primeiros segmentos abdominais juntos; estes são subiguais; o segundo segmento abdominal, truncado no ápice, é mais comprido do que o terceiro e o quarto reunidos.

Comprimento, inclusive o bico, de 6 a 10 mm.; maior largura, no prothorax, de 1,8 a 3 mm.

Fêmea. — Difere do macho pelo rostro arqueado, fino, liso; escrobo partindo do meio do rostro. Pronoto ligeiramente mais estreito do que os elitros, não bombeado no dorso, sem sulco no meio; femures dianteiros com um dente; espora nas tíbias minúsculo.

Descrito sobre abundante material, apanhado pelo autor na fazenda Copioba, munic. de Nazaré e nos municípios de Jequié, Ilhéos etc. em palmeiras do gênero *Attalea*.

Tipo e cotipo na coleção do autor. A espécie, sob o N. 2.545, foi remetida ao Prof. Hustache, França; ao Museu Entomológico, Berlim-Dahlem e ao Bureau of Entomology and Plant Quarantine, Washington.

b) *Hoplorrhinus hustachei*, n. sp.

Grande, tamanho variável; a cor varia de testáceo a bruno-escuro; certas partes são pretas. Pubescência amarela, forte no dorso, fina deitada em baixo. Dimorfismo sexual pronunciado.

Macho. — Cilíndrico. Mais pigmentado do que a fêmea. Rostro pouco mais curto do que o torax, vermelho-escuro, carinado, subreto; duas fileiras de seis dentes largos na base, alinhados em carenas laterais fortes na face frontal; base ligeiramente cônica, pontilhada, pilosa. Escrobo no terço apical; escapo pouco encurvado, liso, claviforme; o primeiro segmento do funículo é o mais grosso e comprido; o segundo pouco mais curto; o terceiro tem a metade do comprimento do anterior e é pouco mais comprido do que 4-7, que são moniliformes, subiguais. Clava com o primeiro segmento ocupando tres quartos do comprimento, engrossando progressivamente; o segundo é mais estreito e muito curto; o terceiro, cônico. No funículo, pouca pilosidade esparsa; clava pilosa. Cabeça pequena, cônica, vermelha, pontilhação fina. Olhos pretos, distantes, planos.

Protorax duas vezes mais comprido do que largo; a maior largura no terço basal ultrapassa a largura dos elitros; base bisinuosa; flancos arredondados no terço basal, retos para a frente, formando ligeira sinuosidade na região antecefálica. Dorso pouco bombeado; um sulco longitudinal na linha mediana; áspero, coberto de covinhas arredondadas; fortemente pubescente com pêlos fortes, deitados. Lados e prosterno glabros, lisos, brilhantes, estriados transversalmente com linhas sinuosas, finas. Colorido frequentemente brúno até preto. Escudo pequeno, piloso.

Elitros paralelos em tres quartos; pontilhados, estriados. Pubescência densa, forte.

Patas dianteiras mais fortes; femur esparso-piloso, fortemente alargado; um dente forte, seguido de saliência obtusa no quarto subapical. Tíbias retas, esparso-pilosas; dois esporões no ápice. Tarsos vermelhos; o segundo curto, com cerca da metade do primeiro. Femur do segundo e terceiro par com dente simples; esporão unico nas tibias.

A distribuição da cor brúna até preta é variavel na intensidade e localização, tanto no corpo como nas patas.

Comprimento, inclusive o bico, de 5 a 10 mm.; maior largura no protorax 2,6 mm.

Fêmea mais clara, não atingindo a pigmentação preta, geralmente testácea; bico liso, arqueado; antenas no meio do rostro; escapo mais curto; prosterno curto, pontilhado, piloso. Pronoto mais achatado, mais estreito, menos largo do que os elitros. Femures como no macho. Tíbias dianteiras com 2 esporões, medianas e posteriores com um esporão; segundo segmento tarsal curto.

Descrito sobre 35 exemplares, coligidos pelo autor em 20-11-40 na fazenda Copioba, munic. de Nazaré, Baía, em flores da palmeira buri (*Diplothemium caudescens* Mart.), desenvolvendo-se as larvas nas espatas internas das inflorescências da mesma palmeira.

Tipo e cotipo na coleção do autor. Paratipos no Bureau of Entomology and Plant Quarantine, Washington. Denominamos a espécie em homenagem ao Prof. A. Hustache, Lagny, França, como homenagem pelo serviço que nos prestou, na classificação dos Curculionídeos.

A especie se aproxima de *H. coplobæ* Hust., do qual difere pelo colorido mais escuro, pronoto menos convexo, pela pilosidade no dorso,



pelos segmentos de funículo e o primeiro da clava. Das espécies anteriormente descritas, difere pelo conjunto dos caracteres.

c) *Hoplorrhinus planithorax*, n. sp.

Oblongo, achatado no dorso; testáceo-uniforme, olhos pretos, rostró do macho enegrecido na metade apical; glabro; pilosidade fina, esparsa na face ventral. Protorax largo na base, margens laterais levantadas em cristas obtusas, deixando o pronoto plano, ligeiramente convexo no meio. Dimorfismo sexual pronunciado.

Macho. — Rostro grosso, subreto, pouco mais grosso na metade basal; glabro, pontilhação alinhada; ligeiramente carenado; carena mediana maior na base; preto na metade distal, ápice avermelhado. Antenas no terço apical; escapo curvo, clavado no quarto distal. Primeiro segmento do funículo grosso, comprido; segundo fino, pouco mais curto; terceiro ligeiramente mais longo que comprido; 4-7 moniliformes. Clava compacta; primeiro segmento o mais comprido, tendo menos de três quartos do compr. da clava; segundo muito mais estreito, de um terço mais curto do que largo; terceiro cônico, pouco mais comprido do que o precedente. Cabeça vista de cima, globosa, vista de lado, cônica; glabra, pilosa no queixo; pontilhação fina. Olhos grandes, distantes.

Protorax pouco sinuoso na base; ângulos posteriores subretos, obtusos; as margens estreitam-se para a frente, sendo arqueadas em dobras obtusas, deixando o pronoto afundado, convexo na parte mediana; superfície glabra, com covinhas irregulares, grossas. Pouco mais comprido do que largo. Largura subigual à dos elitros ou pouco mais estreita. Comprimento cerca da metade dos elitros. Prosterno com pontilhação fina. Escudo minúsculo, triangular.

Elitros com a base côncava, lados paralelos em tres quartos do comprimento, ápice oblongo-arredondado; oito sulcos longitudinais, no fundo dos quais carreiras de covinhas redondas; com pilosidade fina, esparsa; praticamente glabros.

Patas: femures nos três pares com dentes simples no quarto apical; tibias arqueadas; um esporão em cada tibia, pequeno, obtuso. Os dois art. tarsaes basais sub-iguais, terceiro mais comprido, quarto de comprimento dos tres anteriores.

Comprim. 7 mm., largura 2 mm.

Fêmea: difere pelo rostró mais comprido, fino, cilín-

drico, arqueado, testáceo; antenas insertas no meio; olhos pequenos, dirigidos mais para a frente.

Descrito sobre uma dezena de exemplares, coligidos pelo autor em flores de *Attalea compta* Mart. no município de Jequié, Baía.

Tipo e cotipo na coleção do autor. Vários exemplares sob o N.º 2.675 remetidos ao Prof. A. Hustache.

A espécie difere das demais principalmente pelo pronoto um tanto côncavo, separado dos flancos pela crista lateral obtusa, pelos caracteres do rosto, antenas e tarsos.

d) *Hoplorrhinus fariai*, n. sp.

Cilíndrico, testáceo-uniforme, rosto escuro, glabro; olhos amarelos; pubescência pequena nos elitros; dimorfismo sexual pronunciado.

**Macho.** -- Rostro subreto, ligeiramente curvo-anguloso e alargado na inserção das antenas; estrias longitudinais, leve pontilhado nos intervalos, achatado, diametro subigual, quilha mediana mais pronunciada na metade basal; comprimento igual ao da cabeça e protorax adicionados. Antenas partindo do terço apical; o escapo encobre um terço do olho, é clavado e curvo no ápice; funículo com o 1.º segmento mais estreito do que a clava do escapo, pouco mais grosso e comprido do que o segundo; terceiro e quarto subiguais, mais curtos do que o segundo; 5-7 alongados, subiguais. Clava com o primeiro segmento perfazendo quatro- quintos do comprimento, pedunculado, alargando-se na segunda metade; segmento segundo curto, pouco largo, unido ao terceiro, que é duas vezes mais comprido e cônico. Cabeça pequena, cônica. Olhos amarelos, grandes, distantes.

Pronoto fortemente globoso no dorso, glabro, pontilhado com covinhas redondas, irregularmente dispostas; pouco mais comprido do que largo; largura na parte mediana subigual à dos elitros; base sinuosa, lados arredondados; colo curto. Escudo comprido, triangular-agudo.

Elitros paralelos em dois terços, côncavos na base; dorso arredondado; estrias pronunciadas, longitudinais; pubescência fina, curta, uniforme nos intervalos.

Lado ventral com pubescência escassa, curta, deitada.

Patas com femures glabros; um dente em cada no terço apical alargado; tíbias arqueadas, pilosas, com espinhos no ápice e um esporão desviado nos tres pares; o das patas

medianas é pequeno. Tarsos: o terceiro articulo é o mais curto.

Fêmea. — Difere do macho pelo rostro ligeiramente mais comprido, arqueado, fino; antenas pouco acima da parte mediana, pronoto menos convexo, etc.

Descrito sobre 7 exemplares, colhidos pelo autor em flores da palmeira pindoba (*Attalea humilis* Mart.), no município de Cachoeira, Baía, desenvolvendo-se as larvas nas espigas da mesma palmeira.

Tipo e cotipo na coleção do autor.

A especie difere das demais pela cor amarela dos olhos, rostro dos machos, caracteres das antenas, pronoto etc.

Dedicamos a especie ao Colega Gastão de Faria, pelo interesse que toma no estudo das palmeiras baianas.

c) *Hoplorrhinus dahlgreni*, n. sp.

Preto; rostro e antenas vermelhas; esterno, abdomen e patas castanho-escuros. Rostro nas fêmeas de comprimento duas vezes maior do que a cabeça e o protorax reunidos. Corpo cilíndrico, glabro, pubescência finíssima, esparsa, esbranquiçada.

Fêmea. — Rostro ruivo, liso, arqueado, fino, cilíndrico, alargado na extremidade, engrossado na base; pontilhações finas. Antenas antemedianas, rúivas, finas; escapo atingindo os olhos; segmentos do funículo delgados, progressivamente mais curtos. Clava pedunculada; o primeiro segmento consideravelmente maior. Olhos pretos, arredondados, laterais. Cabeça castanha, arruivada, lúidia, pontilhações pequenas; na frente um afundamento alongado em forma de sulco curto entre os olhos.

Pronoto mais comprido do que largo, de largura subigual á dos elitros, subreto na base, arqueado nos lados, formando na frente um colo alongado, superfície com pontilhões densas, finas; escaminhas minúsculas, distantes, mais frequentes nos lados do colo. Escudo pequeno, mais largo do que longo, arredondado no ápice.

Elitros paralelos em dois terços, ligeiramente achatados no terço basal do dorso na parte sutural; estriados longitudinalmente com covinhas alinhadas, rasas, portadoras de pêlos minúsculos ruivo-esbranquiçados; no ápice conjuntamente angulado-arredondados.

Patras pedunculadas, delgadas. Femures dos tres pares com um dente no alargamento interno, na metade distal. Tí-

bias subretas, com esporão no ápice. Tarsos ruivos; primeiro segmento mais comprido; os dois seguintes subiguais em comprimento.

Esterno e abdomen pontilhados, covinhas armadas com pequenos pêlos distantes, esbranquiçados.

Comprimento sem o rostro de 6 a 7 mm. O rostro cerca de 4 mm.

Macho. — Difere da fêmea pelo rostro mais curto, menos arqueado, subquadrangular, antenas no terço apical.

Descrito sobre tres exemplares, duas fêmeas e um macho, criados pelo autor da espata interna de *Cocos botryophora* Mart., colhida no municipio de Nazaré, Baía.

Tipo, cotipo e paratipo na coleção do autor.

Difere das demais especies pela côr e o conjunto de outros caracteres.

Dedicamos a especie ao Prof. B. E. Dahlgren, Field Museum of Natural History, Chicago, especialista em palmeiras, cuja visita à Baía deu novo estímulo às nossas investigações

## 2) *Genero Phytotribus* Schönh.

Este gênero, criado em 1843, abrange, conforme Coleopterorum Catalogus de W. Junk, por A. Klima (Eirrhinae, 1934), quatro espécies, todas de Cayena.

*Ph. lineatus* Thoms 1871

*Ph. pallidus* Buquet, 1836,

*Ph. rectirostris* Thoms. 1879

*Ph. unicolor* Boh 1843

As quatro espécies são de biologia desconhecida.

Em 1939 fornecemos ao Prof. Hustache, França, especialista em Curculionídeos, tres novas espécies e verificámos que as mesmas se desenvolvem nas espatas internas das inflorescências de palmeiras, tendo os mesmos hábitos como o gênero *Hoplorrhinus*.

Pelos caracteres puramente morfológicos, Hustache em 1934, sugeriu unir esses dois gêneros, que figuravam em diversas subfamílias, em uma tribu: Hoplorrhini.

Certificamo-nos que existe entre os mesmos perfeita analogia biológica, desenvolvendo-se os seus representantes no mesmo ambiente: espatas de palmeiras.

As novas espécies foram descritas por Hustache na «Revista de Entomologia» vol. 11, 1940. São estas:

*Phytotribus platyrhinus* Hust. 1940. Desenvolve-se nas espatas de licuri (*Cocos coronata* Mart.).

*Phytotribus (Phytotribicellus) cocosa* Hust. 1940. Desenvolve-se nas espatas de *Cocos botryophora* Mart.

*Phytotribus (Phytotribicellus) attaleæ* Hust. 1940. Desenvolve-se nas espatas de piassaveira (*Attalea junifera* Mart.).

Adicionamos mais duas espécies, que julgamos novas:

a) *Phytotribus andaiac*, sp.

Subcilíndrico, castanho-cinzento, superfície áspera, com covinhas, escamosa, escamas largas, brancas; nos elitros cinco carreiras de escamas compridas, chatas, intervaladas por escamas curtas, ovoidais, largas para o ápice; patas pubescentes, pilosidade filiforme; tibias deanteiras com esporão maior do que as medianas e posteriores.

Fêmea. — Rostro arqueado, glabro na metade apical, pontilhado, estriado-anguloso e escamoso na metade basal; escaminhas curtas, chatas, largas, brancas; comprimento do rostro subigual ao do pronoto. Antenas no meio do rostro; escapo fortemente curvo no ápice, clavado; o primeiro segmento do funículo da grossura dos ulteriores; segmentos 3 a 7 subiguais em comprimento, pouco mais longos do que largos; clava com o primeiro segmento quatro vezes mais comprido do que o segundo e terceiro reunidos; cônico em dois terços, globoso para o ápice; o segundo mais estreito, curto; o terceiro mais longo, cônico. Cabeça vermelha, globosa, coberta de covinhas finas, redondas, espaçadas; escamas curtas, espatuladas, mais densas na fronte. Olhos pretos, pequenos, distantes.

Pronoto áspero, com covinhas densas; escamoso; a largura subigual ao comprimento; base sinuosa; lados arqueados, angulosos no meio. Escudo minúsculo.

Elitros pouco mais largos do que o protorax, paralelos em dois terços; cada elitro com nove fileiras longitudinais de covinhas alinhadas, maiores; nos intervalos covinhas menores, de escamas. Em cada elitro, cinco fileiras de escamas longas, clavadas, curvas; nos intervalos escamas curtas, espatuladas, cuja largura é quasi igual à metade do comprimento.

Patras pequenas, pilosas.

Macho: difere pelo rostro mais grosso, fortemente escamoso em todo o comprimento; antenas no terço basal; pronoto mais longo do que largo.

Descrito sobre 22 exemplares, machos e fêmeas, colhidos pelo autor nas inflorescências de andaiá (*Attalea compta* Mart.), no município do Rio Novo, Baía. Cria-se nas espatas internas da mesmas palmeira.

Tipo e cotipo na coleção do autor.

Em tamanho e conformação a especie é próxima de *Phytotribus attaleæ* Hustache, da qual difere pela coloração geral mais escuro-cinza e principalmente pelas escamas largas no rostro, torax e elítros, especialmente as escamas pequenas nos elítros, cuja largura é a metade do comprimento, enquanto no *Ph. attaleæ* Hust. essas escamas são quasi cilíndricas, filiiformes.

b) *Phytotribus pindobae*, n. sp.

Testáceo-avermelhado, pubescente, elítros fortemente estriados; rostro relativamente grosso, arqueado.

Fêmea. -- Rostro liso, com estrias finissimas, longitudinais; recurvado; pouco mais comprido do que o pronoto. Antenas no meio do rostro, finas; escapo liso, pouco clavado e inflexo. Funículo com o primeiro segmento da grossura do ápice do escapo, do comprimento dos dois mediatos juntos; segmentos 3-7 moniliformes; o último não faz parte da base da clava; pêlos esparsos, curtos. Clava pilosa; primeiro segmento pedunculado, cônico, formando dois terços da clava; o segundo mais estreito, curto; o terceiro triangular, cônico. Cabeça globosa, lisa; olhos envoltivos, pretos, distantes, mais próximos no queixo.

Pronoto de comprimento subigual à largura, pouco mais estreito do que os hombros dos elítros; base pouco sinuosa, lados arqueados, sem formar colo; áspero, piloso, coberto de covinhas arredondadas, fortes. Escudo pequeno, arredondado no ápice.

Elítros subparelhos, arredondado-cônicos no ápice; comprimento cerca de duas vezes maior que a largura; fortemente estriados, com cerca de 9 alinhamentos de covinhas fortes, redondas, armadas de pêlos; em cada elitro ha cerca de 9 fileiras de cerdas fortes.

Prosterno e mesosterno tessellados com finissimas malhas transversais; no mesosterno há covinhas arredondadas, esparsas, grandes; metasterno liso, pouco chagrinado e sem covinhas.

Femures engrossados no meio, pilosos. Tíbias pliosas, com espinhos maiores no ápice e esporão, desviado do lado.

Comprimento do corpo (incluindo cabeça e rostro) de 3,5 a 4 mm.; largura nos elytros de 1,2 a 1,4 mm.

Macho: difere da fêmea pelo rostro mais grosso, espaçado-piloso; antenas no terço apical do rostro.

Descrito sobre 13 exemplares, colecionados pelo autor em flores masculinas da palmeira pindoba (*Attalea humilis* Mart.), na fazenda Copioba, município de Nazaré, Baía.

Tipo e cotipo na coleção do autor.

Conformação e tamanho de *Ph. attaleæ* Hust. e *Ph. andaiaæ*. Difere das duas pelos pêlos finos no corpo, não clavados, nem escamosos.

### c) Subfamília *Petalochilinae*

La cordaire, na sua obra «Histoire Naturelle des Insectes, Gen. Col.», vol XI, 1863, instituiu a subfamília *Petalochilinae*, que na côorte dos Synmerídeos entra na falange das espécies com pigídio encoberto, ao lado dos Errrhinéos, distinguindo-se pelo pronoto separado dos flancos do pronoto pelas arestas laterais. A subfamília abrangia 3 gêneros com 7 espécies, delas 6 brasileiras.

No «Coleopterorum Catalogus» de W. Junk, pars 144, 1935, por K. W. von Dalla Torre e E. Voss, foi mantida a subfamília *Petalochilinae*, com os mesmos tres gêneros *Ancylorrhynchus*, *Balanephagus* e *Petalochilus*. Os primeiros dois são brasileiros e o último é de Cayenna.

As sete espécies brasileiras, depois de 1863, nenhuma nova foi adicionada, o que atesta o prolongado estacionamento nas investigações deste grupo de insetos.

Abordaremos rapidamente os dois gêneros, que, conforme nos parece, são bem representados na nossa fauna entomológica.

#### 1) Gênero *Ancylorrhynchus* Gemm. et Har.

O «Catalogus Coleopterorum» de Gemminger et Harold, 1871, incluye no gênero quatro espécies, todas brasileiras:

*A. agrotus* Fahrs. 1843

*A. mutabilis* Fahrs. 1843

*A. parvus* Fahrs. 1843 e

*A. variabilis* Gyll. 1836.

O «Coleopterorum Catalogus» de W. Junk, pars 144, 1935, adiciona às quatro espécies antigas, uma quinta, *Ancylorrhynchus Burmeisteri* Faust, 1894, originária da Argentina.

Na «Revista da Sociedade Entomológica Argentina», vol. 9, 1937, sob o título «Curculionides Nouveaux de l'Uruguay», A. Hustache descreveu duas novas espécies: *A. Tremolerazi* Hust. e *A. pictipennis* Hust., ambas apanhadas em flores de *Cocos pulposa* B. Rodr.

No último número da «Revista de Entomologia», foi divulgada uma espécie baiana *Ancylorrhynchus trapezicollis* Hustache, 1940, que apanhamos em grande numero nas flores da palmeira licuri (*Cocos coronata* Mart.), encontrando-se ocasionalmente também em *Cocos nucifera* L.

Não eram conhecidas as plantas de seiva das quatro espécies antigas.

No mês de setembro de 1940, por ocasião do Nono Congresso Geográfico Brasileiro, em Florianópolis, apanhámos naquela cidade sulina, numa inflorescência de gerivá (*Cocos Romanzoffiana* Cham.), mais de 250 exemplares de *Ancylorrhynchus*, que identificámos como *A. aegrotus* Fahrs.

Por gentileza do Dr. Juan Bosq, do Serviço de Zoologia Agrícola do Ministerio de Agricultura da Republica Argentina, recebemos exemplares de *A. variabilis* Gyll., colhidos em *Cocos capitata* Mart.

Na Baía colhemos mais uma espécie pertencente a este gênero, que se encontra nas flores de *Cocos botryphora* Mart. ou pati.

Das nove espécies atualmente conhecidas, cinco vivem em flores de palmeiras do gênero *Cocos*. As outras são de biologia desconhecida. É lógico supor que as outras espécies provêm também de palmeiras do mesmo gênero ou de gêneros próximos. Parece-nos que cada espécie de *Cocos* possui sua própria espécie de *Ancylorrhynchus*.

Levantamos esta sugestão para despertar o interesse dos entomólogos para as investigações das inflorescências das nossas palmeiras, sob o ponto de vista entomológico. Passamos a descrever a espécie, que consideramos nova.

a) *Ancylorrhynchus botryophorae*, n. sp.

Ovoidal, amarelo-pálido-uniforme no dorso; escamas amarelo-claras; rosto escuro-avermelhado a preto-carregado; esterno variavelmente pigmentado de flavo-puro até preto-píceo especialmente nos epimeros mesotorácicos e metasterno. Dimorfismo sexual fraco, sendo os machos sempre menores.

Rosto de vermelho-tijolo a preto, com a parte apical



avermelhada; ha sete quilhas longitudinais, sendo as laterais mais fortes, dando ao rostro uma forma achatada; intervalos entre as carenas irregularmente pontilhados; ápice largo, com fortes cerdas ruivas; mandibulas pretas; quilha mediana bifurcada na região ante-apical, fechando-se depois a bifurcação, formando um alvéolo alongado. O comprimento do rostro é pouco maior que o comprimento da cabeça e do torax reunidos. Antenas vermelho-uniformes; escapo atingindo o olho, clavado, pouco ciliado; funículo com os tres segmentos tarsais compridos; o primeiro, o mais grosso, subigual em comprimento ao terceiro; o segundo mais comprido; segmentos 4-6 subiguais, curtos, mais compridos do que largos, progressivamente mais grossos, ligeiramente pedunculados. Clava de 4 segmentos; o primeiro ligeiramente pedunculado, subigual em comprimento ao segundo; terceiro e quarto unidos, cônicos, em conjunto pouco mais compridos do que o segundo. Cabeça cônica, pilosa; olhos grandes, pretos, pouco convexos.

Protorax trapeziforme, subcônico, mais largo do que comprido, mais estreito do que a base dos elitros; margem basal pouco sinuosa, angulos obtusos, lados ligeiramente arqueados. Escudo trapezoidal, mais largo para o ápice.

Elitros alargando-se para a parte mediana, lados arqueados; redondos no ápice; oito estrias longitudinais em cada elitro, pouco impressas, formada de pontilhações redondas, distantes.

Protorax e elitros cobertos com escaminhas pequenas, densas, de côr fulvo-clara.

Esterno de côr amarelo-clara até preto-carregada, principalmente em roda das coxas e nos epimeros mesotorácicos.

Patas uniformemente amarelas. Femures pilosos, com dente na parte larga postmediana. Tíbias arqueadas, pilosas, com um calcanhar e esporão obtuso e curto no ápice. Tarsos: o primeiro articulo o mais comprido, o terceiro pouco mais curto; o segundo o menor.

Tamanho variavel, as fêmeas geralmente maiores, atingindo 9 e 10 mm. de comprimento, inclusive o rostro, com 4,5 mm. de maior largura no terço posterior dos elitros.

Coligido pelo autor em flores da palmeira pati (*Cocos botryophora* Mart.). Descrito sobre 6 exemplares.

Tipo na coleção do autor.

A especie é próxima a *A. trapezicollis* Hust., com a qual se parece pelos caracteres das antenas, do protorax etc. Difere pela côr

mais clara do corpo, nunca cinzenta; pelo colorido preto carregado no esterno, que nunca se observa em *A. trapezicollis* e pelo segundo segmento dos tarsos mais curto do que o terceiro. O tamanho em geral também é maior. Das outras espécies diferencia-se facilmente pela uniformidade do colorido do dorso, pelo comprimento relativo dos segmentos do funículo, etc.

## 2) Gênero *Balanephagus* Schönh.

Na nossa série de «Notas Entomológicas da Baía», Parte VI, 1940, fizemos algumas considerações sobre este gênero, mencionando as espécies já conhecidas e descrevendo uma espécie nova. Adicionamos aqui mais uma espécie que julgamos nova.

### a) *Balanepus fernando-costai*, n. sp.

Preto, dorso chato, áspero, pubescência escassa, rostró curto, achatado, alargado no ápice, pronoto plano, transversó elipsoidal, patas brúnas.

Macho. — Rostro ligeiramente curvo, carinado, subquadrangular, densamente doirado-piloso na face frontal subplana; base entre os olhos concava; crista mediana mais pronunciada no terço distal, pubescente; lado de baixo tuberoso, com covinhas entre as carenas.

Antenas partindo do terço apical, bruno-escúras, fortes, ruivo-pilosas, escapo pouco curvo, no ápice clavado, com poucos pêlos isolados; funículo com o primeiro segmento pouco mais fino do que a clava do escapo; comprimento subigual ao segundo, mais fino; o terceiro cilíndrico, tendo a metade do comprimento do segundo; 4-6 curtos, iguais em comprimento, pouco engrossados progressivamente; clava dupla; segmento basal curto-pedunculado, largo para o ápice, isolado por um sulco fundo dos três segmentos terminais; o segundo o mais largo, mais largo do que longo; o quarto cônico, subigual em comprimento ao segundo. Cabeça pequena, pontilhada, áspera, fronte pilosa; olhos grandes, pretos, distantes.

Protorax chato, da largura dos elitros, transversó-elipsoidal, cerca de duas vezes mais largo do que comprido; base bisinúosa, ápice subreto, lados fortemente arqueados; subdividido no meio por uma crista mediana baixa, lisa; superfície áspera, coberta de covinhas finas; há pequenos tubérculos lisos, espalhados nos ombros. Pilosidade rara, ruiva, densa nas margens latero-posteriores e na linha mediana poste-

rior, formando tres máculas ruivas alongadas no pronoto. Escudo subquadrado, ruivo-piloso.

Elitros com a base sinuosa; lados ligeiramente arqueados, arredondados no ápice; dorso pouco convexo; superfície áspera, finamente tuberosa; ha oito estrias longitudinais, formadas pelas covinhas alinhadas. Pilosidade ruiva, escassa, concentrada nos hombros e no ápice, formando máculas ruivas; as duas máculas apicais oceladas, tendo uma iris preta no meio.

Lado ventral com pilosidade rara, nas covinhas esparsas.

Patas fortemente pilosas; femures com um dente triangular, mais largo no terceiro par; tíbias arqueadas, com pêlos densos, clavados, eretos; dois esporões no ápice, sendo um maior, em forma de gancho; tíbias do primeiro par anelado-engrossadas no meio e com pequenos dentes na margem interna da metade apical; tarsos progressivamente mais curtos.

Comprimento até 12 mm., inclusive o rostro; largura 5,5 mm.

Fêmea: difere do macho pelo rostro glabro, liso, carenas menos pronunciadas; tíbias anteriores sem engrossamento no meio e sem tuberculos; tamanho subigual ao do macho ou menor.

Descrito sobre 10 exemplares, sendo 3 machos, apanhados pelo autor nas inflorescências de burí (*Diplothemium caudescens* Mart.), criando-se as larvas na face interna das espatas da mesma palmeira. O inseto passa o estado de nympha no casulo, aderente á espata. Ciclo evolutivo cerca de 6 meses, correspondendo ao tempo da maturação dos frutos.

Fazenda Copioba, município de Nazaré, Baía, 20/11/1940.

Tipo e cotipo na coleção do autor.

Difere a especie das duas baianas do mesmo gênero pelo tamanho maior, dorso mais achatado, preto; pronoto mais alargado dos lados; caracteres das antenas, patas e máculas no dorso e ápice do elitros.

Dedicamos a especie ao illustre colega agrônomo, o sr. Dr. Fernando Costa, Interventor em S. Paulo, como testemunho de simpatia pessoal e aprovação da acertada orientação, dada ao Ministério da Agricultura durante a sua gestão, procurando relevar na economia nacional a importância das palmeiras do Brasil.

d) Subfamília *Barinae* Hust.1) Genero *Microstrates* Lacord.

Na tribu «Baridiides», Lacordaire (Gen. Col. VII, 1866) criou o genero *Microstrates* para uma espécie, provinda do Brasil, *M. cucullatus* Boh. (1844), de biologia desconhecida. Em 1922, colhemos em flores de licuri (*Cocos coronata* Mart.), na Baía, abundante material de uma nova espécie, que foi

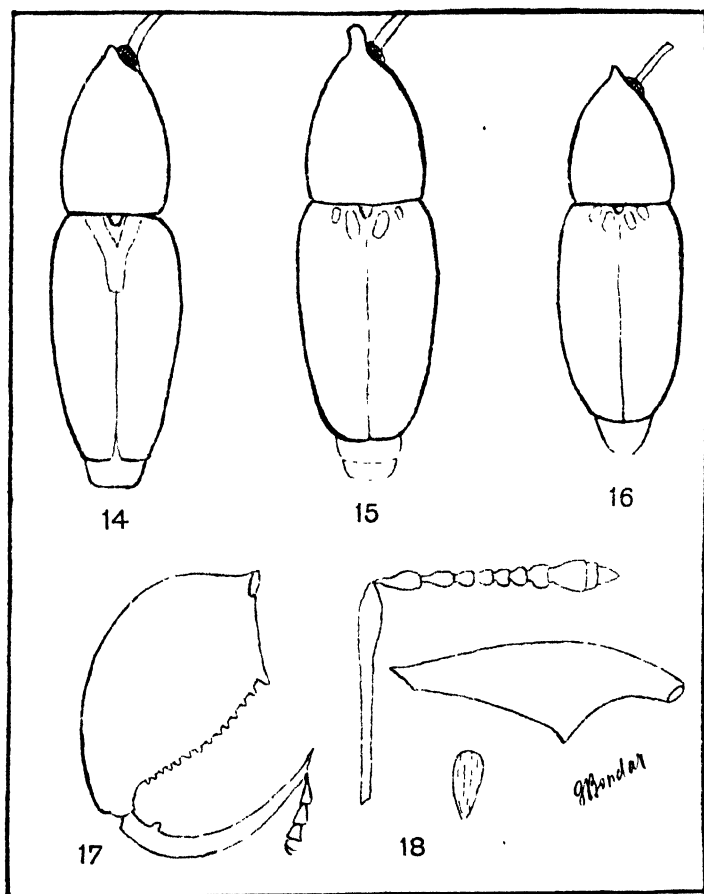


Fig. 14. *Microstrates ypsilon* Marsh. — Fig. 15. *Microstrates bondari* Hust. — Fig. 16. *Microstrates coccois* n. sp., — Fig. 17. *Pachymerus diospirosi* n. sp., femur posterior. — Fig. 18. *Balanophagus fernando-costai* n. sp., antenna, femur anterior e escama da tibia da fema. († Bondar del.)

descrita por Marshall como *M. ypsilon* Mshl. (Ann. Mag. Nat. Hist., IV, 1929), espécie que entrou no «Terceiro Catálogo de Insetos que vivem nas plantas do Brasil», 1936,

de Costa Lima. Posteriormente estudámos a biologia desta espécie, publicando os dados nas «Notas Entomológicas da Baía», Parte V, 1940.

Investigando a origem das pragas do coqueiro, submetemos nos dois últimos anos, ao estudo mais meticoloso a fauna das palmeiras nativas do Brasil. Descobrimos mais duas espécies de *Microstrates*.

Ambas desenvolvem-se em flores masculinas de palmeiras brasileiras do género *Cocos*, completando o ciclo evolutivo dentro das flôres. Uma delas foi denominada por Hustache em 1940. Infelizmente, devido às condições da política europeia, a descrição da espécie não chegou às nossas mãos para publicidade. Julgamo-la extraviada e redescrevemos a espécie nova.

a) *Microstrates bondari* Hust. n. sp. (in litt).

Preto, patas avermelhadas; escamas esbranquiçadas, curtas, largas, resistentes na face ventral, caducas no dorso, exceto nas manchas pequenas da base dos elitros, ao lado do escudo; delas duas são maiores e duas internas pequenas, que frequentemente faltam. Escrobo antenal lateral. Dimorfismo sexual pronunciado.

Fêmea. — Rostro reto, cilíndrico, fino, liso, avermelhado na metade basal; antenas no terço basal; escapo fino, fortemente clavado, curvo no ápice, pouco mais comprido do que os dois primeiros segmentos do funículo juntos. Funículo espaçado-piloso, de 7 segmentos; o primeiro o mais longo e grosso, pouco mais fino no ápice do que a clava do escapo; o segundo de um terço mais curto; terceiro a quinto subiguais, mais longos do que largos; o sexto e sétimo progressivamente maiores. Clava pubescente, de 3 segmentos, deles o primeiro cerca de duas vezes mais comprido do que os restantes e mais largo; o segundo curto, pouco mais comprido do que o segundo, mais estreito, redondo no ápice. O comprimento do rostro subigual ao do pronoto, inclusive a protuberância frontal. Cabeça pequena, globosa, escondida; olhos pretos, arredondados.

Pronoto com a base subreta, lados ligeiramente arqueados, protuberância frontal preta, superfície excavada de covinhas subexagonais; comprimento pouco maior que a largura. Escudo arredondado na base, reto no ápice.

Elitros nos ombros pouco mais largos do que o pronoto; base ligeiramente concava; lados pouco arqueados, estreitando-se para tras; extremidade arredondado-obtusa, não encobrindo o pigídio. Há nove sulcos longitudinais; intervalos com uma fileira de covinhas finas. Na base, ao lado do escudo, uma mancha escamosa flavo-clara, acompanhada, às vezes, de uma menor, externa.

Lado ventral e pigídio fortemente escamosos; escamas flavo-esbranquiçadas, ovoidais, chatas, curtas, distantes.

Patas medianas menores; todos os femures pouco engrossados; pêlos esparsos, pequenos; tíbias subretas, pouco pilosas, armadas no ápice de pêlos, espinhos e um esporão desviado; os dois primeiros artigos dos tarsos subiguais, o terceiro maior.

Comprimento 6 mm., inclusive o bico; largura 1,8 mm.

Macho: difere da fêmea pelo rostro mais grosso, rugoso, curto, encurvado; antenas medianas, protuberância frontal do pronoto mais pronunciada, geralmente avermelhada no ápice; pronoto pouco mais longo.

Descrito sobre 10 exemplares, machos e fêmeas, sendo alguns deles criados do flores masculinas da palmeira pati (*Cocos botryophora* Mart.). O ciclo evolutivo se faz dentro da flor, exigindo cerca de um mes. Baía, município de Nazaré.

Tipo e cotipo na coleção do autor. A espécie, sob o N. 2.699, foi remetida ao Prof. Hustache, França.

Difere do *C. ypsilon* Mshl. pelas manchas escamosas nos elitros, rostro mais comprido; protuberância frontal do pronoto mais pronunciada, desviada para cima, segundo segmento do funículo mais curto etc.

#### b) *Microstrates cocois*, n. sp.

Preto uniforme, luzente, tíbias e tarsos ligeiramente arruivados, escamas claro-cinzentas, caducas no dorso, máculas escamosas na base dos elitros, duas em cada, de tamanho igual.

Fêmea. — Rostro liso, cônico, ligeiramente arqueado; comprimento subigual ao do pronoto; antenas no terço basal. Escapo fortemente clavado, curvo, no ápice; o primeiro segmento do funículo pouco mais fino do que a clava do escapo, mais longo e grosso do que o segundo; segmentos terceiro ao sétimo mais largos do que longos, alargando-se progressivamente. Clava pubescente; o primeiro segmento

duas vezes mais comprido do que os dois terminais juntos; o segundo curto e mais estreito; o terceiro duas vezes mais comprido do que o precedente, arredondado no ápice.

Pronoto subcônico, pouco mais longo do que largo, subreto na base, pouco arqueado nos lados, densamente coberto de covinhas. Escudo preto, pequeno.

Elitros pouco mais largos na base do que o pronoto, arqueados nos lados, separado-arredondados no ápice, não encobrindo o pigídio preto; ao lado do escudo, na base, duas máculas claras escamosas em cada elitro, delas as internas são menores. Ha nove sulcos longitudinais; intervalos com fileira irregular de pontilhação pequena.

Lado ventral escamoso.

Patas com os femures esparso-pilosos; tíbias com pouco pêlos, um tufo denso de pêlos finos e longos no ápice e um esporão. Tarsos com os segmentos 1 e 3 subiguais em comprimento; o segundo mais curto.

Comprimento 5 mm., incluindo o rostro; largura 1,5 mm.

Macho: difere da fêmea pelo rostro mais grosso, rugoso, antenas no meio do rostro ou pouco mais abaixo.

Descrito sobre cerca de 150 exemplares, apanhados pelo autor em flores do *Cocos Romanzoffiana* Cham., em Florianópolis, Est. de Santa Catarina.

Tipo, cotipo e paratipos na coleção do autor.

Difere das espécies precedentes pelo desenho nos elitros, caracteres do funículo, tamanho menor e a cor uniforme preta.

#### 4) Um Bruchideo novo do genero *Pachymerus*

O genero *Pachymerus* contem 11 espécies brasileiras ou sul-americanas. Delas, apenas uma entrou no «Terceiro Catálogo dos Insetos que vivem nas Plantas do Brasil», de Costa Lima, conhecendo-se a sua biologia. Adicionamos mais uma espécie, que julgamos nova.

##### 1) *Pachymerus diospirosi*, n. sp.

Bruno-amarelado-cinzeno; com pubescencia densa, cinzentocastanha, antenas amarelas; os primeiros 4 segmentos globoso-cilíndricos; o segundo é o menor de todos; os sete segmentos apicais laminados, subtriangulares, largos. Cabeça enegrecida; olhos pretos, salientes. Protorax e elitros concolores. Protorax com a base fortemente sinuosa, de largura pouco menor

que a dos elitros; arredondado, estreitando-se para a frente, superfície pubescente, com pontilhação fina; mais largo do que comprido.

Elitros com 10 fileiras de covinhas irregularmente distanciadas, fundas, pequenas.

Femures posteriores chatos, largos, subovoidais, mais largos para a base, com uma fileira de dentes começando no terço basal, progressivamente diminuídos na margem interna.

Tibia fortemente arqueada, lisa.

Comprimento do ápice do pronoto á extremidade dos elitros, 8-9 mm.; a maior largura nos elitros 5 mm.

Descrito sobre cerca de 100 especimens, criados em sementes de *Diospiros* sp., Ebenácea, árvore conhecida por «cana de urubú» no sul baiano.

Tipos e paratipos na coleção do autor. A especie, sob o N.º 2.563, foi remetida ao Instituto Entomológico de Berlin-Dahlem, em 4-8-1939.

Difere do *Pachymerus nucleorum* Fabr. pelo tamanho menor, corpo mais amarelado, fileiras de covas pronunciadas nos elitros e, principalmente, pelos dentes nos femures posteriores e a sua disposição, que distingue a especie tambem de outras já descritas.

### **Mycetophilidae (Diptera) collected by the expedition to Matto Grosso of the Brazilian Zoological Club, in July 1939**

by F. W. Edwards (†), British Museum (Natural History)

(With 1 plate)

Through the kindness of Dr. Clemente Pereira, Director of the Club, and of Dr. John Lane, collector of the material, I have had the privilege of studying the Mycetophilidae collected during the Expedition of the Clube Zoologico Brasileiro to Salobra, Matto Grosso, in July 1939. The collection included 60 specimens belonging to 22 species, of which 11 are described as new in this report; the high proportion of new species is only what might have been expected in view of the present rudimentary state of our knowledge of the Mycetophilid fauna of South America, and of Matto Grosso in particular. Three species of the subfamily Sciarinae, represented in the collection by single specimens of doubtful identity, are not reported upon. It seems



worthy of note that not more than half a dozen of the species in this collection are also present in the large collection (300 or more species) made by Mr. F. Plaumann in Santa Catharina.

The types of the new species are preserved in the British Museum through the generosity of Drs. Clemente Pereira and Lane.

### Ceroplastinae

#### *Ceroplatus* Bosc.

#### *Neoceroplatus* nov. subg.

Differs from other subgenera of *Ceroplatus* in the form of the palpi, which though rigid and composed of only one distinct segment as usual are rather long and slender. Venation also peculiar in that the base of  $R_s$  is almost transverse, and veins  $M_2$ ,  $Cu_1$  and  $An$  are all markedly abbreviated. A further small peculiarity (in the specimens available for study) is that the last (16th) antennal segment has a slender, white, terminal projection which is protected above and below by a short black seta. Three ocelli; pleurotergites hairy; tibial setae in regular rows throughout; vein  $R_1$  ending in  $R_1$ ; all as in *Ceroplatus* s. str.

Subgenotype: *Ceroplatus minimax* Edw. (Costa Rica).

#### *Ceroplatus* (*Neoceroplatus*) *minimax* Edw., var.?

1 ♂, no. 1.202.

This specimen differs from the type male from Costa Rica (which is no longer before me for exact comparison) in having the dark ring on the hind femur very narrow and close to base; wings with a larger dark spot over base of  $R_s$ , but spot surrounding  $R_1$  quite separate from the dark area at tip. A female from Nova Teutonia, Santa Catharina (Plaumann coll.) is much more like the Costa Rican type, having similar wing-markings and nearly the middle half of hind femur dark. Whether these Brazilian specimens represent distinct species or mere variations of *C. minimax* can only be judged when more material is available.

### *Platyura* Mg.

#### *Platyura*, nov. subg.

Wings with branches of media and cubitus bare. Costa very little produced; radio-median fusion very long, several

times as long as stem of median fork;  $M_2$  complete;  $An$  long but not reaching margin. Mesonotum uniformly setulose. Pleurotergites, postnotum and anepisternites bare. No spiracular hairs. Tibial setulae in numerous regular rows throughout. Spurs 1, 2, 2, outer spur of posterior tibiae not very short, both spurs normal and pointed, not enlarged at tip as in *Lapyruta*. Hypopygium of simple type, with two teeth at the tip of the long flattened style.

Subgenotype, *Platyura macilenta* F. Lynch Arr. Additional species are *P. (Lyprauta) burmeisteri* Edw., *P. (Lapyruta) batesi* Edw. and the new species described below.

*Plautyra* is well distinguished from most or all other subgenera of *Platyura* by the great length of the *rm* fusion. By hypopygial structure and in general appearance it would seem to be allied to *Isoneuromyia*, from which it differs in its bare veins.

*Platyura (Plautyra) salobrensis*, sp. n.

♂. — Head orange-yellow, with a black ocellar spot, face, palpi and first four or five antennal segments yellow, rest of antennae black. Eyes with the lower facets enlarged (an unusual feature which is also found in *P. macilenta* and may prove common to the species of this subgenus). Thorax orange yellow with an oval black spot above each wing-root and faint indications of two narrow convergent dark stripes in front of scutellum, but no trace of median dark stripe; scutellum and postnotum darkened in middle, but pleurae entirely yellow. Abdomen with segments 1-5 yellow, 5 entirely so but tergites 1-3 black basally and tergite 4 black except on its posterior margin; segments 6-8 and hypopygium entirely black. Legs yellow except for the darkened tarsi and black spurs. First front tarsal segment about 1/4 longer than tibia. Wings clear, no trace of darkening at tip. Halteres with dark knob.

Wing-length 4.5 mm.

1 ♂, no. 1.191.

*P. salobrensis* is closely related to *P. macilenta* F. Lynch A., but the latter (as represented by a male in the British Museum taken by Mr. J. Lane at São Paulo, 6.IV.39) is larger, with a broad median black stripe on front of mesonotum, hind femur dark at base, and wing-tip distinctly darkened.

*Apyrtula*, nov. subg.

Wings with branches of media and cubitus bare. *Sc* reduced to a short stump, beyond which it is only faintly traceable as a furrow. Costa unusually long, reaching nearly or quite two-thirds of the distance from  $R_5$  to  $M_1$ .  $R_1$  very short, situated at or beyond midway between tips of  $R_1$  and  $R_5$ . Radio-median fusion short, much shorter than stem of fork.  $M_2$  narrowly interrupted at the base (in the two known species). *An* short and indistinct. Three ocelli. Mesonotum uniformly setulose. No spiracular, anepisternal, pleurotergal or mediotergal hairs. Tibial setulae in regular rows throughout, some rows rather stronger than others but not conspicuously so as in *Platyura* s. str. Front tibial spur short; outer spur of middle tibia rudimentary, of hind tibia less than half as long as inner spur. Hypopygium: Tergite rather short and truncate, not covering anal segment which is terminal in position. Coxites much longer than tergite, separated practically to the base. Styles simple, ending in a single tooth-like process.

Subgenotype, the new species described below; a second species is also before me in the Plaumann collection.

*Apyrtula* differs from most if not all other subgenera of *Platyura* in the abbreviated subcosta. Apart from this the characters as described above seem to indicate affinities with the subgenera *Pyratula*, *Iyprauta* and especially *Platyura* s.str.

*Platyura* (*Apyrtula*) *abbrevinervis*, sp. n.

♂. — Head black, face yellow. Palpi and base of antennae brownish, most of flagellum black, segments short, mostly much deeper than long, with short pubescence. Thorax black, scarcely shining, with the pronotum clear yellow and margin of scutellum yellowish, otherwise unmarked. Abdomen blackish, with posterior margins of tergites 2-5 broadly yellowish. Legs yellow, including all coxae, but middle and hind femora dark at base beneath. Wings nearly clear, with a slight dark shade at tip on costal half, not extending below  $M_1$ . *An* scarcely reaching level of *mcu*. Halteres clear yellow. Hypopygium: style of moderate length, but markedly shorter than coxite, with conspicuous tufts of hairs on both outer and inner margins before middle and ending in a slender, sharp, black-

ened point; tegminal plate large and broad, reaching to end of coxites.

Wing-length about 3 mm.

1 ♂, no. 1.207.

### Sciophilinae

*Mycomyia clavata* F. Lynch A. (?)

27 ♀, nos. 1.206, 207, 210, 213, 214.

This species is evidently nearly allied to *M. dorsimacula* End. of Santa Catharina, and may perhaps be a form of it. Whether either Enderlein's species or the Salobra form is the same as Lynch's from Buenos Aires cannot at present be decided. It is curious and unfortunate that most specimens of this group received at the British Museum are females, which cannot be positively determined. The main characters of the group to which these species belong are as follows:

Branches of *M* and *Cu* all setose. *Sc*<sub>2</sub> ending about opposite *R*<sub>1</sub>; *Sc*<sub>1</sub> present. *fCu* below or scarcely before base of *Rs*. Scutellum with four bristles. Abdominal tergites yellow basally at sides, their posterior margins dark. Middle coxa of male with short spur (about half length of coxa) projecting forwards.

*Neoempheria pereirai*, sp. n.<sup>1</sup>

♀. — Head mainly dark brownish; scape brown, flagellum and palpi black. Ocellar bristles short. Thorax uniformly dark brown above and somewhat shining; bristles scantier than usual, dorso-centrals irregularly uniserial, acrostichals few; scutellum with two strong bristles as in all other known neotropical species. Pleurae mainly blackish-brown, but lower part of pleurotergite and whole of sternopleura whitish-yellow, the two colours abruptly separated. All coxae whitish yellow with the tips pale brownish yellow; femora and tibiae slightly darker than coxae, tarsi dark. Abdomen mainly blackish; tergite 2 with a rather narrow yellow transverse band beyond the middle but with whole of posterior margin dark; tergite 4 with a yellow spot on each side at about the middle; 7

1) This species is also described in a revision of the Neotropical species of *Neoempheria* written in December 1939 for publication in "Novitates Zoologicae".

mainly yellowish. Wings with very distinctive markings: distal third wholly dark, the dark area broadly connected on hind margin with a dark median band; basal third wholly clear. *Sc* reaching only a short distance beyond base of *Rs*, *Sc*<sub>2</sub> transverse and near its tip; small cell much shorter than stem of median fork, which is rather long; costa distinctly produced; *jCu* well before base of *Rs*. *Sc*, *M*<sub>2</sub>, *Cu*<sub>1</sub>, and stem of *Cu* completely bare, *M*<sub>1</sub> and *Cu*<sub>2</sub> setose. Halteres dark.

Wing-length 3 mm.

1 ♀. No. 1.210.

This species is very different from all others of the genus known to me from South America, in the colouring of thorax and abdomen and in the markings and trichiation of the wings

*Cluzobra lanei*, sp. n.

♂. — Head mainly dark, but flagellar segments (except the last few) each with the distal two-thirds yellow; palpi black. Thorax with the usual narrow dark stripes convergent behind, but these less obvious than in some of the other species, the median stripe scarcely perceptible. Abdomen blackish. Coxae mainly dark, hind coxae pale at base. Hind femur yellow with a narrow dark ring at base. Spurs blackish as usual. Wing with the macrotrichia dense, covering much of basal cell as in *binocellaris*. A blackish mark begins on base of *Rs* and extends narrowly into base of median fork. A narrow dark grey band crosses wing beyond middle; on costal margin it touches but lies mostly beyond tip of *Rs*; on posterior margin and also in cell *R*<sub>5</sub> it is connected with a light grey area which covers much of the tip of the wing. Halteres with dark knob as usual. Hypopygium: sternite with a pair of short pointed projections in middle; styles definitely articulated to sternite (unlike the other species), infolded and not visible in the dry specimen, entirely black, bare and pointed.

Wing-length 3.5 mm.

1 ♂. No. 1.210.

*Dziedzickia cryptura*, sp. n.

♂. — Head shining brownish, black on the ocellar area. Palpi of moderate length, light brownish. Antennae not very long or stout, first 6-7 segments orange, rest blackish. Ocelli

rather large, especially the laterals, which are nearly twice their diameter from the eyes. Thorax with scutum shining black; prothorax, scutellum, postnotum and whole of pleurae yellow. *dc* and *acr* biserial; scutellum with four long bristles; only two long pronotal and one propleural; pleurotergites bare. Abdomen with segment 1 yellow, tergites 2-5 black with their posterior margins broadly yellow; 6-8 black; sternites 1-6 yellow. Hypopygium very small and withdrawn (so much so that I at first took the specimen to be a ♀); structure simple, somewhat as in *Tetragoneura*; style simple, sinuous, pointed, black. Legs yellow, including spurs, only the tarsi dark; no secondary sexual features; tibial bristles fairly numerous but quite short. Wings slightly tinted; very short setae on all veins.  $Sc_2$  placed a little beyond middle of basal cell,  $Sc_1$  represented by a short stump, not reaching costa.  $fCu$  a little before base of *rm*. Halteres with knob darkened.

♀. — Resembles ♂ in colouring. Segments 3 and 4 of front tarsi very slightly thickened.

Wing-length about 2.5 mm.

1♂ (type), and 1♀, no. 1.197. A second ♀ (no. 1.213) has the scutellum black and probably represents another species.

This species resembles *D. nigra* Fisher of Costa Rica in its bare pleurotergites, differing in its yellow pleurae. It is only provisionally referred to *Dziedzickia*, pending a revision of the South American genera and species of this group.

*Leia fuscicornis*, sp. n.

♀. — Belongs to the *completa* group, agreeing with other species of this group in having four scutellar bristles, all veins reaching margin, yellow halteres, and wings with a pre-apical dark band and two other dark marks. Very similar to *L. completa* Kert., *diversicornis* Kert. and *interrupta* Kert., and agreeing with them in having three black marks on scutum posteriorly and pleurotergites clear yellow like the pleurae; differs from all three most obviously in the darker antennae, the flagellum being almost wholly blackish above and only its first two or three segments yellowish below. Black marks on scutum sharply defined, the supra-alar spots small, median spot longer, squared off in front and extending half-way across scutellum; no other marks on thorax. Abdomen with equally wide and complete black bands on each of

tergites 2, 3 and 4; 5 with a wider black band which almost reaches base in middle; 6 almost all black. Legs yellow, hind femur narrowly dark at base beneath as well as at tip. Wings with the pre-apical band broad, dark, and equally distinct from costa to hind margin.

2 ♀, nos. 1.214 (type) and 1.217.

*Leia incompleta* Edw. (?)

1 ♀, no. 1.213. Wing, plate 15, fig. 5.

*Leia salobrensis*, sp. n.

♀. — Belongs to the *truncatonevosa* group i. e. with only two strong scutellar bristles, a strong ventral bristle on front tibia, and unmarked wings with both  $M_2$  and  $Cu_1$  abbreviated, not reaching margin. Differs from all the species of this group hitherto described in its much darker colouring. Head yellowish, darker across front; antennae short, first four or five segments pale, rest dark. Thorax mainly blackish brown, only anterior third of scutum and the whole scutellum yellow. Abdomen blackish brown above, tergites 2-4 with small pale areas in middle at base, 5 with rather large basal lateral yellowish spots. Legs yellow, including all coxae; middle and hind femora very narrowly blackish at base beneath, hind femur narrowly black at tip. Bristles long and black; mid tibia with two ventral bristles. Spurs yellowish. Halteres yellow as in other species of this group.

1 ♀, no. 1.210.

*Tetragoneura flavicauda*, sp. n.

♂. — Head shining black; palpi clear yellow; antennae with first three segments yellowish, rest black. Ocelli in line, equidistant from one another and from eyes. Thorax entirely black, including pronotal lobes and hypopleura; mesonotum rather brightly shining, pleurotergites velvety black; bristles and hairs black. Mesonotum with well-marked bare stipes. Scutellum with two long bristles. Abdomen with segments 1-6 entirely black and rather shining, 7-8 and the small hypopygium pale yellow. Ninth tergite almost divided into two by a median constriction; style divided almost to base into two arms, the dorsal arm pointed and bare, the ventral arm more rounded at tip and with three strong bristly hairs which

project ventrally. Legs yellow, including all coxae, but hind femur with nearly the distal half black and spurs and tarsi darkened. Coxae and middle tibia simple, the latter with three dorsal and three external bristles. Wings slightly and evenly tinted;  $R_1$  present, the small cell short.  $R_1$  and stem of median fork both somewhat longer than  $rm$ . All veins setulose as usual. Halteres clear yellow.

♀. — Differs from ♂ in having abdominal segments 5 and 6 as well as ovipositor yellow; 4 with a broad yellow band at base, and even 3 with some yellow at base.

Wing-length about 2.2 mm.

1 ♂ (type), no. 1.218; 1 ♀, no. 1.214.

The yellow genitalia in both sexes, and the form of the male styles, will distinguish this species from the other known South American species of the genus with simple legs

### Mycetophilinae

#### *Neallodia brevicornis* (End.)

1 ♂, no. 1.206.

This species, described as an *Allodia*, must, I think, be referred to the genus *Neallodia*, in spite of some divergences from the genotype, *N. flavida* Edw. In *brevicornis* there are several fairly strong anepisternal bristles, and the costa is scarcely produced beyond tip of  $R_5$ ; in *flavida* the anepisternite has more numerous hairs which are however all very short, and the costa is conspicuously produced. In most other respects however the two species are extremely similar; they are evidently not nearly related to *Allodia*, but are much more like *Cordyla*, from which genus they differ chiefly in that the second palpal segment is not at all swollen.

The Salobra specimen agrees well with males of *N. brevicornis* in the British Museum from Paraguay and São Paulo.

#### *Delopsis planiventris* (End.)

1 ♂, no. 1.206.

The genus *Delopsis* is extensively developed in Brazil, and to it belong most of the species described by Enderlein under *Mycetophila* or *Plastacephala*, as well as numerous undescribed species in the British Museum collection.



## Sciarinae

### *Pseudosciara hirtella* Schin. (?)

A male specimen (no. 1.207) agrees with Schiner's type male from Colombia in the following features: Thorax, abdomen, palpi and halteres black. Legs yellow, including all coxae. Wings clear, not at all darkened at tip;  $R_1$  ends above  $fM$ ; costa reaches about half-way from  $R_5$  to  $M_1$ ;  $An$  absent.

Five females (nos. 1.207, 210 and 214) are probably conspecific with this male, but differ as follows: Coxae more or less darkened (though not black even in the darkest specimen); middle femur darkened, and hind femur blackish. Wings evenly tinted with brown over the whole surface, but not very dark.

### *Pseudosciara covalba*, sp. n.

♀. - Allied to *Ps. hirtella*, with which it agrees in its black colour and in venation as noted above, also in wing-length (4 mm.), differing as follows: Antenna with scape yellowish. First abdominal tergite pale yellow at sides. Coxae all whitish yellow, strongly contrasting with the blackish middle and hind femora. Wings largely clear in middle, but with the tip darkened as far back as base of median fork; much of axillary area also somewhat darkened. Halteres with the stem almost white, strongly contrasting with the black knob.

2 ♀, nos. 1.199 and 214.

### *Pseudosciara grisapex*, sp. n.

♂. — Head, thorax and abdomen black, moderately shining. Palpi brownish. Thoracic hair and bristles black, the notopleural series moderately long and strong. Abdomen rather densely clothed with black hair. Legs yellow, including all coxae; even the hind femur is very little darkened. Wings mainly clear, but the tip greyish to nearly as far as base of median fork; costal cell and hind margins also greyish.  $R_1$  ending above or just beyond level of  $fM$ ; costa reaching scarcely more than a third of the distance from  $R_5$  to  $M_1$ ;  $An$  represented by a long row of macrotrichia. Halteres with black knob and yellowish stem. Hypopygium of the structure usual in this genus.

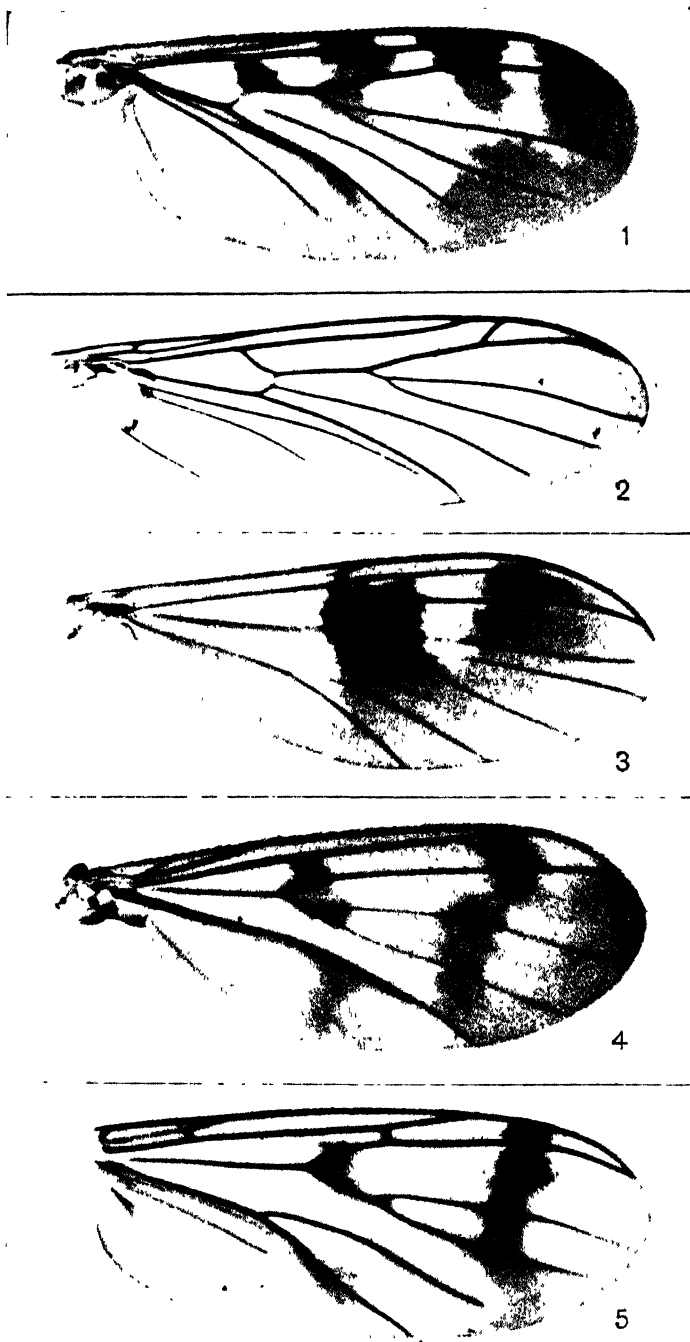


Fig. 1. *Ceroplatus (Neoceroplatus) minima* Edw. var. ? — Fig. 2. *Platyra (Platyra) sa-*  
*lobrensis* Edw. — Fig. 3. *Neocemphria pereira* Edw. — Fig. 4. *Cluzobra lanei* Edw. —  
Fig. 5. *Leia incompleta* Edw.



Q. — Differs from ♂ in having all coxae blackish, grey-dusted; front femur dark except at tip; middle and hind femora blackish; wings with the grey area at tip less extensive, leaving almost the basal third of median fork clear. Lateral abdominal membrane yellow.

Wing-length about 4.5 mm.

1 ♂, (type), no. 1.217; 2 ♀, nos. 1.205 and 218.

This species must be very similar to several others which have been described, such as *striata* Rübs., *luteicoxa* End., *pedunculata* End., *paradoxa* Pettey and *lindneri* Ldf., but I do not find in the descriptions of these any mention of the darkened wing-tip, which appears to me to be of some diagnostic importance. *Ps. grisapex* appears to be widely distributed in the Neotropical region, as there are very similar specimens in the British Museum from British Guiana and Trinidad; these however exhibit some variations.

*Pseudosciara thoracica* Ldf.

1 ♀, no. 1.214.

In this specimen the wings are mainly light brownish, but with a clear area in the middle extending across the stem of the median fork and base of cubital fork. For the rest the specimen agrees with Lengersdorf's description of the type female from Costa Rica, having two black marks on the thorax, and abdomen with tergite 1 yellow, 4 brownish yellow, 2, 3 and 5 blackish; legs yellow; head black; palpi yellow; costa reaching  $\frac{2}{3}$  of distance from  $R_5$  to  $M_1$ ; etc. Lengersdorf does not mention the wing-colour in his type.

*Pseudosciara trifasciata* Coq.

1 ♀, no. 1.197.

A small species very much resembling *Ps. thoracica*, from which it differs chiefly in the colour of the abdomen; tergites 2-5 are each blackish with a narrow yellow band at the base. Coquillett's type was from Nicaragua, and I know of no other record. In the present specimen the wings are only faintly tinted, and the clearer area in the middle is therefore only just discernible.

*Eugnoriste pernitens*, sp. n.

Q. — Head brightly shining black, bare. Antennae and palpi black, the three palpal segments subequal in length and thickness. Labrum and labium about as long as eye. Eye-

bridges 2 facets wide. Thorax brightly shining black, both above and on sides, almost completely bare, with only a very few minute dorso-central hairs. Abdomen with integument entirely dull, tergites not strongly chitinised; black above and on sides, with narrow yellowish bands between segments, venter yellow. Legs yellow, including all coxae; tarsi and hind femur and tibia darkened; spurs 1.2.2. as usual and quite short; no obvious tibial bristles. Wings hyaline, veins dark except for stem of media.  $R_1$  less than half as long as  $R$  and ending far before  $M$ ; costa reaching fully  $3/4$  of distance from  $R_5$  to  $M_1$ ;  $rm$  unusually short. Halteres blackish.

Wing-length about 2 mm.

1 ♀, no. 1.214.

I refer this species to *Eugnoriste* on account of the elongation of the labrum and labium, but these parts are not so long as in the North American species of the genus.

### Thysanoptera from Minas Gerais, Brazil (Second paper)

by Dudley Moulton

This paper completes the identification of Thysanoptera collected in Minas Geraes, Brazil and forwarded to me by Mr Edson J. Hambleton. One new genus, a new subgenus and seven new species are included in this report. All of the collections were made by Mr. Hambleton and I am indeed grateful to him for the opportunity of studying this interesting material and take pleasure in naming the one new genus after him. Forty species in all, twenty-five of which are new, and twenty-two genera are the result of Mr. Hambleton's efforts, for the Minas Geraes area. Types are in the author's collection.

#### *Corynothrips flavus*, n. sp.

Female holotype: Color clear yellow including antennae and legs, without gray or brown coloring or red pigmentation.

Total body length 1.38 mm.; head length measured from anterior margin of eyes 0.133 mm., width across cheeks 0.113 mm., across eyes 0.123 mm.; length of head projection 0.020 mm.; length of prothorax 0.113 mm., greatest width 0.143

mm.; width of mesothorax 0.20 mm., width of abdomen (fourth segment) 0.190 mm. Antennal segments length (width): I, 20 (20); II, 76 (20); III, 33 (26); IV, 46 (16); V, 40 (16); VI, 30; VII, 13; VIII, 10; IX, 13 microns. Length of spines: interocellars 80, on anterior angles of prothorax 53, posterior angles 83 outer and 40 microns inner.

General appearance long and slender, all legs slender; head longer than wide, head projection only about half as long as in the genotype *stenopterus* Williams. Eyes prominent and protruding, ocelli approximate, interocellar spines placed close together and within the ocellar triangle, these are long and with distal fringes as in the genotype. Antennae as in genotype. Mouthcone reaching half across prosternum.

Prothorax (in the middle) wider than long, with one prominent spine on each anterior angle and two on each posterior angle, the outer of which is longer and with a curved tip, the inner approximately half as long, these spines like the interocellars and prominent spines on ninth and tenth abdominal segments with fringed tips, those on ninth segment also with curved tips. Wings as in the genotype. Abdomen long and slender.

Male unknown.

Type material: female holotype taken on a legume «fedegosa», April 4, 1932. (Moulton index number 5217)

Type locality: Minas Geraes, Brazil.

### Genus *Sericothrips* Haliday, 1836

Group I: Wings clear, or with irregular spots or shadings, without distinct dark blotches or cross bands

<i>luculentus</i> Moulton.	(Minas Geraes, Brazil)
<i>inversus</i> Hood.	(Dominica, Trinidad)
<i>flavens</i> Moulton.	(Minas Geraes)

Group II: Fore wings with one dark median crossband, which fades before the end, tip of wing clear

<i>williamsi</i> Hood.	(West Indies)
<i>tricinctus</i> Hood.	(West Indies, Minas Geraes)
<i>sternalis</i> Hood.	(Panama)

Group III: Fore wing with one broad median crossband, followed by a white band, tip of wing dark.

<i>portoricensis</i> Morgan.	(Porto Rico; Minas Geraes)
<i>portoricensis</i> var. <i>extremus</i> Moulton	(Minas Geraes)

Group IV: Fore wing with two smaller dark median crossbands, tip of wing clear.

*fasciatus* Moulton. (Minas Geraes)  
*varius* Moulton. (Minas Geraes)

*Sericothrips tricinctus* Hood

One specimen taken in rose blossoms October 1, 1933 at Minas Geraes. (No. 5272).

*Sericothrips portoricensis extremus*, n. var.

This variety differs from the species in having the last four abdominal segments, in addition to segment six, nearly clear yellow; these last four segments however are shaded with light brown as distinct from sixth segment and are not dark brown as in the species.

Type material: female holotype and two female paratypes taken on coffee foliage, July 21, 1933. (No. 5191)

Type locality: Minas Geraes.

*Sericothrips flavens*, n. sp.

Female holotype: Color brownish yellow; anterior margins of abdominal segments two to seven each with a dark brown transverse line, these bordered at the sides with a brown blotch, segment eight without such line but like seven with a continuous transverse light brown band; ninth and tenth segments clear yellow, four to eight gray brown; legs mostly yellow but darkened with brown in the middle of femora and tibiae; wings with a clear area near base otherwise shaded light brown; prominent body and wing spines brown; crescents of ocelli orange.

Total body length 0.926 mm.; head length 0.093 mm., width across eyes 0.15 mm., across cheeks 0.136 mm.; prothorax length 0.83 mm., width 0.15 mm.; pterothorax width 0.2 mm. Antennal segments length (width) III, 36 (20); IV, 53 (22); V, 43 (18); VI, 50 (16); VII, 10; VIII, 13 microns.

This species is very close to *inversus* Hood found in the West Indies but is separated partly by its color but more particularly in the length of antennal segments, segment III in *inversus* is about three times as long as wide and VIII is much longer than VII. In *flavens* the third antennal segment is more compact, not noticeably constricted before the end and VII and VIII are of about equal length.

Male unknown.

Type material: female holotype taken from an unknown shrub in the woods, June 22, 1933. (No. 5284)

Type locality: Minas Geraes, Brazil.

*Sericothrips varius*, n. sp.

Female holotype: Prevailing color brown; head, mesothorax, anterior half of metathorax, abdominal segments two, three, four, seven, eight and nine almost uniformly brown; prothorax, posterior half of metathorax, abdominal segments five, six and ten clear yellow; antennal segments one and two clear yellow, three grayish yellow, slightly mottled, four abruptly brown in basal two-thirds, lighter in distal third, five to eight brown; legs yellow, darkened with brown in middle of femora and tibiae; wings brown at base including scale, followed by three white and two alternating bands, the tip of wing being white; prominent spines brown.

Total body length 1.04 mm.; head length 0.11 mm., width across eyes 0.156 mm., across cheeks near posterior margin 0.126 mm.; length of prothorax 0.10 mm., width near middle 0.173 mm.; width of pterothorax 0.236 mm. Antennal segments length (width) I, 20 (26); II, 36 (30); III, 50 (23); IV, 53 (22); V, 43 (16); VI, 50 (16); VII, 10; VIII, 10 microns.

This species is distinctive in its banded wings and in this respect resembles *fasciatus* Moulton also found in Minas Geraes but this latter species is mostly yellow, brown coloring on the abdomen is limited to transverse lines on segments two to seven bordered at the sides with a transverse brownish spot, except on segments two and seven where the darkened area is continuous across the segments; also the third and fourth antennal segments are relatively much longer. In *varius*, the brown bands on abdominal segments two to four and seven to nine are continuous across these segments but appear to be darker at the sides due to the closely placed microsetae.

Type material: female holotype taken in rose blossoms, October 1, 1933, (No. 5272).

Type locality: Minas Geraes, Brazil.

Genus *Enneothrips* Hood, 1933

The genotype *gustaviae* Hood has a series of small setae along the posterior margin of the prothorax and on the



posterior angles which are all of about equal length. In the new species *flavens*, there is one major spine on each posterior angle which is about three times longer than the others in the series. I am therefore erecting a new subgenus *Enneothripiella* to include this species.

*Enneothrips* (*Enneothripiella* n. subg.) *flavens*, n. sp.

Female holotype: prevailing color brownish yellow; head brown, prothorax brown at the sides and in posterior third, median anterior two-thirds clear yellow; meso- and metanotum brown, otherwise pterothorax yellow; tergites of abdomen each with a median transverse brownish patch, yellowish coloring is complete. Antennal segments brown except only the third which is lighter at base and tip, and a small clear band just above brown pedicles of three and four; legs mostly clear yellow; fore wings brown except for a light area near base; prominent spines brown.

Total body length 1.17 mm.; antennal segments length (width) III, 40 (20); IV, 50 (20); V, 40 (16); VI 36 (16); VII, 14; VIII, 10; IX, 13 microns. Prominent spines on posterior angles of prothorax 50 microns.

This species is very close to the genotype *gustaviae* Hood but is easily separated by its color, the development of a major spine on posterior angles of prothorax and the absence of red pigmentation.

Type material: female holotype taken on India tea, May 23, 1933. (No. 5252)

Type locality: Minas Geraes, Brazil.

*Scirtothrips manihoti* Bondar, 1926

Two female specimens taken on Mandioca leaves, April 10, 1933 at Minas Geraes, Brazil. (No. 5212).

*Plesiothrips amblycauda* Hood, 1925

Two specimens taken on rice foliage April 10, 1933 at Minas Geraes, Brazil. (No. 5275)

*Plesiothrips octarthrus* Hood, 1925

Two specimens taken on rice foliage April 10, 1933 with the previous species. (No. 5275).

*Cephalothrips venustus*, n. sp.

Female holotype: Color chestnut brown, only third antennal segment lighter, being yellowish brown; all tarsi and ends of all tibiae clear yellow; wings clear.

Total body length (abdomen distended) 2.1 mm.; head length 0.176 mm., width 0.125 mm.; prothorax length 0.12 mm., width 0.18 mm.; pterothorax width 0.18 mm.; tube length 0.10 mm., width at base 0.05 mm.

This species is a true *Cephalothrips* and is especially characterized as follows: the eighth antennal segment is conical and broadly joined to seven, seven is not broadly joined to six as in the genotype *monilicornis* Reuter but pediculate as are also segments three to six. The postoculars and all spines on prothorax have expanded tips. Fore femora are slender and fore tarsi unarmed. In the species *canarius* Priesner and *errans* Moulton the fore femora are enlarged and fore tarsi armed much as in *Karnyothrips*. Wings are fully developed, clear, fore wings with 4-6 double fringe hairs. The tube is about 0.6 as long as head and its width at base is approximately half its length.

*Venustus* appears to be most closely related to *elegans* Moulton but this latter species has larger fore femora and tibiae are clear yellow.

Type material: female holotype taken on citrus foliage October 23, 1932, (No. 5267), and female paratype taken on dead stems of Mandioca, April 10, 1933. (No. 5214).

Type locality: Minas Geraes.

*Probolothrips*, nov. gen.

Head somewhat longer than wide with noticeable projection in front of eyes; cheeks with short stout spines arising from small warts. Eyes large, rounded; antenna with eight segments, three to seven broadly club-shaped, pediculate. Prothorax strong, with median dorsal thickening in male, this is almost obsolete in female; all normal spines developed, midlaterals placed far forward near those on anterior angles. Fore femora greatly enlarged in the male, not so much in female, fore tibiae short and thick in the male, more slender in the female, unarmed; fore tarsus in the male armed with a strong curved tooth which occupies the entire inner surface of that segment, unarmed in the female. Mouthcone short,

rounded. Wings fully developed, with parallel sides. Tube swollen at base in the males, with parallel sides in median three-quarters, distinctly constricted at end; in the female the tube has rather straight sides, narrowing gradually but constricted at tip as in males.

Type of genus: *hambletoni* Moulton.

This genus is especially characterized by having shelf-like projections on the fore angles of the mesothorax, somewhat as in *Dinothrips* but these are simple and not forked as in *Dinothrips*. The mesothorax in the female is normal, without processes. The female is rather similar to *Ramakrishnaiella* Karny but the several small check spines on raised warts would separate it from this latter genus as also from *Phrasterothrips* Priesner. The large eyes would also separate it from *Hoplothrips* Amy. & Serv.

*Probolothrips hambletoni*, n. sp.

Male holotype: Color chestnut brown with front and sides of head, sides of thorax and abdomen darkened with black, tube lighter in basal two-thirds, blackened in distal third; antennae blackish brown, with segment two lighter distally and three light brown, yellow at base; fore femora brownish yellow at distal ends, middle and hind legs blackish brown, with tarsi and joints lighter. Prominent spines clear. Wings clear.

Total body length 2.0 mm.; head length including process 0.22 mm., width 0.176 mm.; prothorax length 0.205 mm., width not including coxae 0.308 mm.; pterothorax width 0.338 mm., length of processes on mesothorax 0.035 mm.; width of abdomen 0.338 mm.; tube length 0.22 mm., width at base 0.076 mm., in middle 0.060 mm., at tip 0.040 mm. Length of fore femora 0.28 mm., width 0.102 mm. Length of spines: postoculars 110, on anterior angles of prothorax 83, inner on posterior angles 83, outer 43, on ninth abdominal segment 133, at tip of tube 133 microns.

Head including process slightly longer than wide, cheeks narrowed somewhat posteriorly, with several short spines on raised warts, the second behind the eyes longest; postoculars placed close behind eyes, very long, pointed; eyes large, oval, ocelli present; all antennal segments clearly separated, three to six broadly clavate, seven ovate, pediculate, eight conical, segment three with two sense cones; mouthcone short, rounded.

Prothorax shorter than head, much wider than long, anterior margin crescent shaped, posterior margin broadly

rounded; median dorsal thickening prominent; all normal spines present, the midlaterals placed far forward and near those on anterior angles, pointed. Fore legs greatly enlarged, each fore tarsus armed with a strong, broad-seated tooth, intermediate and hind legs slender. Each fore angle of mesothorax with a prominent shelf-like process. Abdominal segments one to six of about equal width and same as pterothorax, following segments gradually reduced; tube as long as head, swollen at base, then with parallel sides to the abruptly constricted tip. Wings moderately slender, right wing without double fringe hairs, left wing with two.

Female allotype: more uniformly chestnut brown and without blackish coloring as found in male.

Shape of head as in male, prothorax weaker, with only a vestige of median dorsal thickening; legs smaller, fore tarsi unarmed; mesothorax without shelf-like projections at sides; tube as long as head, not swollen at base as in male but with sides more gradually reduced to the constricted tip. Fore wings with four double fringe hairs.

Type material: male holotype, female allotype and one male paratype taken on dead stems of *Mandioca*, April 10, 1933. (No. 5214)

Type locality: Minas Geraes, Brazil

*Trybomia intermedia* var. *fiebrigi* Priesner

One female specimen taken on foliage of *Tibochina mutabilis* April 21, 1933 at Minas Geraes. (No. 5228).

*Phloeothrips (Hoplandrothrips) affinis* Hood

One male specimen taken on rice foliage April 10, 1933 at Minas Geraes. (No. 5278)

*Dichaetothrips mandiocae*, n. sp.

Female holotype: Color blackish brown, abdominal segments one to five somewhat lighter; third antennal segment abruptly lighter, shaded in outer third; fore tibiae and tarsi brown; wings clear, slightly clouded at base and with faint indication of median line in middle of wing; prominent spines clear.

Total body length, abdomen distended, 3.22 mm.; head length 0.294 mm., width 0.26 mm.; prothorax length 0.20

mm., width 0.41 mm.; pterothorax width 0.51 mm.; tube length 0.308 mm., width at base 0.10 mm. Antennal segments length (width) I, 50 (43); II, 70 (40); III, 93 (40); IV, 76 (36); V, 73 (36); VI, 76 (33); VII, 50; VIII, 40 microns.

This species has the general shape and appearance and is very close to *claripennis* Moulton from the Hawaiian Islands. It is separated by its rather abruptly blackish brown fourth antennal segment, in *claripennis* the fourth is yellowish brown in basal half. Also *mandioca* is distinguished by its longer head spines, the postoculars are longest, 150, postocellar 100 and antecellar 56, these are 105, 50 and 0 respectively, in *claripennis*. The new species, it will be noted has both ante- and postocellar spines developed, the latter however are much the stronger.

Type material: female holotype and one female paratype taken on dead twigs of *Mandioca* September 15, 1933. (No-5211)

Type locality: Minas Geraes, Brazil.

#### Records and descriptions of Tipulidae from tropical America (Diptera) Part IV.

by Charles P. Alexander

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(With 7 figures)

In the present report, I am discussing various species of crane-flies from Middle America and from Trinidad. The majority of the new forms were included in very extensive series of these flies taken at and near Potrerillos, Chiriqui, Panama, in May 1935 by MacSwain. A smaller number were included in large collections of Neotropical Tipulidae submitted to me for determination by Dr. Hans Zerny, contained in the Vienna Museum. A few other sources of material are mentioned under the respective species in the text. Except where specifically indicated to the contrary, the types of the novelties are preserved in my personal collection of these flies.

## Records of distribution

*Tanypremna (Tanypremna) opilio* Osten Sacken. — Costa Rica: Turrialba, September 26, 1920 (A. Alfaro); U.S.N.M.

*Brachypremna dispellens* (Walker). — Costa Rica: Orotina, September 2, 1920 (A. Alfaro); U.S.N.M. Panama: Barro Colorado, December 22, 1928 — February 14, 1929 (C. H. Curran); A.M.N.H.

*Brachypremna candida* Alexander. — Panama: Barro Colorado, December 22, 1928 — January 4, 1929 (C. H. Curran); A.M.N.H.

*Brachypremna similis* Williston. — Panama: Barro Colorado, January 9, 1929 (C. H. Curran); A.M.N.H.

*Brachypremna williamsoni* Alexander. — Panama: France Field, Canal Zone, January 18, 1929 (C. H. Curran); A.M.N.H.

*Tipula macrosterna* Alexander. — Honduras: La Libertad, Comay, altitude 2500 feet, June 1928 (J. B. Edward); M.C.Z.

*Polymera (Polymera) niveitarsis* Alexander. — Costa Rica: Turrialba, September 26, 1920 (A. Alfaro); U.S.N.M.

*Polymera (Polymera) obscura* Macquart. — Panama: Gatun, December 12-14, 1912 (Zetek); U.S.N.M. Cabima, May 23, 1911 (Busck); U.S.N.M.

*Polymera (Polymerodes) conjuncta* Alexander. — Panama: Gatun, December 12, 1912, at light (Zetek); U.S.N.M.

*Icteria (Icteria) armillaris* (Fabricius). — Panama: Barro Colorado, July 1924 (Nathan Banks); M.C.Z. Water Cay, Bocas del Toro, August 27, 1917 (Axel Olsson).

*Teucholabis (Teucholabis) pleuralis* Alexander. — Guatemala: Bananera, 1928 (J. J. White). Costa Rica: Turrialba, September 6-18, 1920; San Jose, September 23, 1920; Tiribi, October 9, 1920 (A. Alfaro); U.S.N.M.

*Toxorhina (Ceratocheilus) niveitarsis* (Alexander). — Panama: Barro Colorado, January 11, 1929 (C. H. Curran); A.M.N.H.

*Toxorhina (Toxorhina) centralis* Alexander. — Guatemala: Bananera, 1928 (J. J. White).

The museum abbreviations given above are standard for the major institutions in the United States: AMNH, American Museum of Natural History, New York; MCZ, Museum of Comparative Zoölogy, Cambridge, Mass.; USNM, United States National Museum, Washington.

## Descriptions of new species

*Tipula orizabensis*, sp. n.

Belongs to the *monilifera* group; antennae (male) about two-thirds the length of the wing, the flagellum bicolored; flagellar segments with stem long and slender, with long delicate setae additional to the strong verticils; wings pale brown, variegated with dark brown and whitish subhyaline; prearcular region not brightened; *Rs* relatively short, about twice  $R_{2+3}$ ; abdominal tergites yellow, with dark brown, sub-

lateral stripes; male hypopygium with the median area of tergite slightly produced, deeply notched.

Male. — Length, about 14-15 mm.; wing, 15-16 mm.; antenna, about 10-10.5 mm.

Female. — Length, about 20-21 mm.; wing, 19-20 mm.

Frontal prolongation of head yellow above, dark brown on sides and beneath; nasus distinct; palpi black, the tips of the second and third segments broadly pale. Antennae (male) about two-thirds the length of wing; scape and pedicel pale yellow; flagellar segments bicolored, the stem yellow, the large knob brownish black; on the outer segments entirely brownish black; stems of intermediate flagellar segments much longer and more slender than in *zotzil*; stems with long, more delicate setae, much longer and more conspicuous than in *zotzil*, from conspicuous punctures. Head brownish gray; front broad, more buffy; a capillary, dark brown vitta on vertex, more expanded in front.

Mesonotal praescutum with the capillary brown median line and the setigerous punctures of the interspaces distinct; humeral and lateral portions of praescutum brown; scutum gray, the median region and each lobe patterned with brown; scutellum brownish testaceous, the parascutella dark brown, this color continued caudad on sides of mediotergite, leaving a pale central triangle, its point behind. Pleura yellow. Halteres with base of stem yellow, the remainder brownish black. Legs with the femora yellow, the tips dark brown, the posterior femora somewhat darker; tibiae and tarsi passing through brown to black. Wings (Fig. 1) with the ground color pale brown, variegated with dark brown and whitish subhyaline; prearcular region narrower than in *zotzil*, not suffused with yellow; cells *C* and *Sc* dark brown; white pattern about as in *zotzil* but basal half of cell *M* more whitened, and the zigzag brightening at midlength of cell *1st A* much reduced; dark brown seams on *m-cu* and distal half of *Cu* broad and conspicuous. Venation: *Rs* relatively short, about twice the length of  $R_{2+3}$ .

Abdominal tergites yellow, with dark brown sublateral stripes; hypopygium more uniformly dark brown. Male hypopygium with the median area of the ninth tergite slightly produced, divided by a linear notch.

Habitat: Mexico.

Holotype, ♂, Orizaba, November 1871 (D. Bilimek); Vienna Museum.

Allotopotype, ♀, June 1871. Paratopotypes, 1 ♂, 1 ♀, with the holotype.

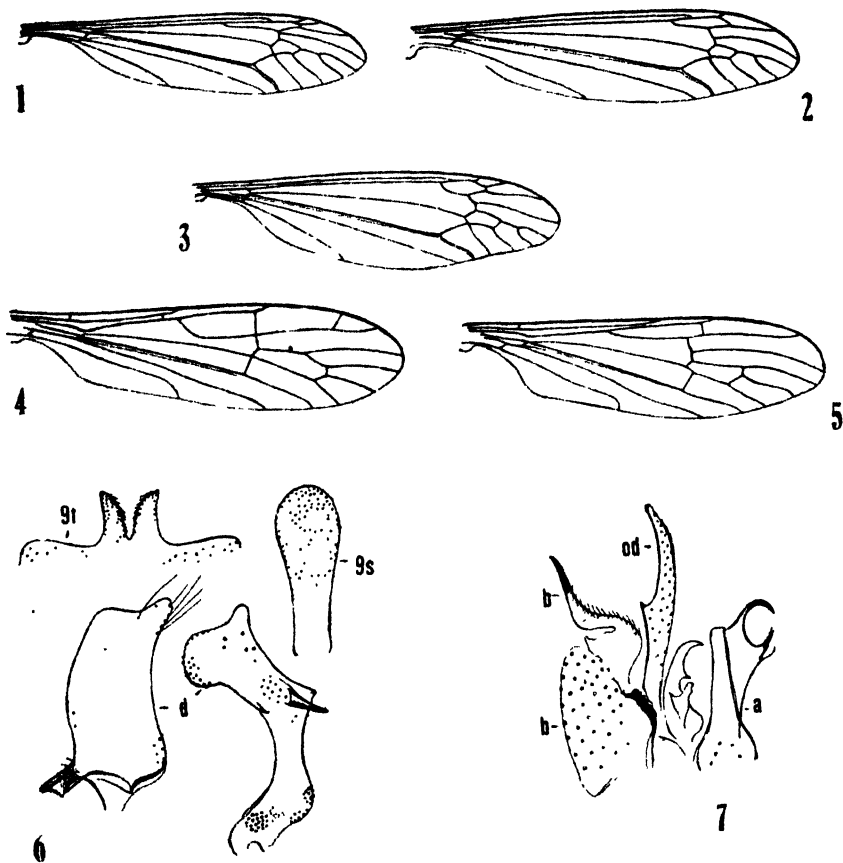


Fig. 1. *Tipula orizabensis*, sp.n., venation. — Fig. 2. *Tipula bilimeki*, sp.n., venation. — Fig. 3. *Tipula trinitatis*, sp.n., venation. — Fig. 4. *Teucholabis (Paratropesa) placabilis*, sp.n., venation. — Fig. 5. *Teucholabis (Teucholabis) hondurensis*, sp.n., venation. — Fig. 6. *Tipula trinitatis*, sp.n., male hypopygium. — Fig. 7. *Teucholabis (Teucholabis) hondurensis*, sp.n., male hypopygium. (Explanation of symbols: a, aedeagus; b, basistyle; d, dististyle; od, outer dististyle; s, sternite; t, tergite).

*Tipula orizabensis* is the most northerly member of the *montilifera* group yet discovered. It differs from the other Mexican species of the group, *T. zotzil* Alexander, in the characters indicated throughout the description. It is more distantly related to the Costa Rican *T. balloui* Alexander.

*Tipula bilimeki*, sp. n.

General coloration brownish gray, the praescutum without



distinct stripes; antennal flagellum brownish black; femora brown, the tips narrowly and gradually brownish black; wings brownish gray, cells *C* and *Sc* abruptly dark brown; outer radial field and seams on anterior and posterior cords conspicuously brown; narrow brown seams elsewhere on wing veins;  $R_{1+2}$  entirely atrophied; ovipositor with fleshy hairy cerci.

Female. — Length, about 15 mm.; wing, 15 mm.

Frontal prolongation of head of moderate length, gray above, brown on sides; nasus distinct; palpi brown. Antennae with scape and pedicel brownish yellow, flagellum brownish black. Head with front and anterior vertex light gray, with a capillary dusky line on the latter; posterior vertex darker gray, with two large, subcircular, more brownish areas on posterior portion.

Pronotum brownish gray. Mesonotal praescutum with disk virtually covered by grayish brown, without evident differentiation of stripes, the lateral portions narrowly lighter gray; scutum and scutellum grayish brown, the postnotum clearer gray. Pleura gray, the dorsopleural region somewhat more yellowish. Halteres with stem light brown, the knob dark. Legs with the coxae gray; fore trochanters yellow, remaining trochanters somewhat darker; femora brown, the tips narrowly and gradually brownish black; tibiae and tarsi brownish black. Wings (Fig. 2) with the ground color brownish gray, somewhat brightened before the cord and stigma; cells *C* and *Sc*, together with the prearcular field, abruptly dark brown; wing tip in outer radial field brown; stigma dark brown; narrow brown seams and clouds at origin of *Rs* and on anterior and posterior cords, interrupted at the fork of *M*; still narrower seams at outer end of cell 1st  $M_2$ , outer medial veins, and distal section of  $Cu_1$ ; veins pale brown, darker in the clouded areas. Squama without setae. Venation:  $R_{1+2}$  entirely atrophied;  $R_1$  in alignment with the short, nearly punctiform  $R_2$ ; *Rs* of moderate length, subequal to the long *m-cu*;  $M_{3-4}$  very short, only about one-third the basal section of  $M_{1+2}$ ; cell 2nd *A* of moderate width.

Basal abdominal tergite with central portions brown; beyond the second tergite much darker, the extreme posterior borders paler, the lateral margins broadly so; outer sternites dark brown; subterminal segments blackened; ovipositor reddish brown. Ovipositor fleshy, the cerci very reduced; hypovalvae longer, appearing as fleshy, densely hairy lobes.

Habitat: Mexico.

Holotype, ♀, Orizaba, June 1871 (D. Bilimek); Old collection of the Vienna Museum.

I am pleased to dedicate this fly to the memory of the collector, Mr. D. Bilimek, whose name is intimately associated with early work on the entomology of Mexico. The species is very distinct in the combination of atrophied  $R_{1-2}$  and the structure of the opivisor. It appears to be allied to the *parishi* group yet the relationship does not appear to be particularly close.

*Tipula trinitatis*, sp. n.

Allied to *urophora*; general coloration of thorax yellow, the praescutum with scarcely differentiated stripes; antennae (male) elongate, exceeding one-half the length of the body, the flagellum bicolored; legs yellow; wings yellowish brown, the costal border darker, this coloration continued to the wing tip; abdominal tergites brownish yellow, the sternites clearer yellow; male hypopygium with the caudal margin of tergite transverse, with two narrow submedian lobes; dististyles irregular in outline; lobes of notch of ninth sternite a depressed pale spatula.

Male. --- Length, about 12 mm.; wing, 12.3 mm.; antenna, about 7 mm.

Frontal prolongation of head polished yellow; nasus distinct; palpi with basal three segments brownish yellow, the terminal segment clear yellow with its apex narrowly darkened. Antennae (male) elongate; basal three segments yellow; succeeding segments bicolored, the small basal enlargement brownish black, the remainder yellow; on outer segments the stem of segment is a little darkened but still the segment is bicolorous; verticils much shorter than the segments. Head brownish yellow, the posterior orbits narrowly gray.

Pronotum yellow. Mesonotum almost uniformly yellow or buffy yellow, the praescutum with scarcely differentiated stripes. Pleura uniformly pale yellow. Halteres with stem yellow, knob weakly darkened. Legs with coxae and trochanters pale yellow; femora and tibiae yellow, the tarsi passing into brown. Wings (Fig. 3) with the ground color yellowish brown, the prearcular field and costal border to the wing tip darker brown, the latter involving the distal ends of all outer radial cells; stigma scarcely differentiated in

color from the adjacent cells; cell *Sc* a trifle more yellow than cell *C*; outer branches of *Media* very narrowly bordered by brown; veins brownish yellow, darker in the clouded areas. Venation: *Rs* strongly arcuated; cell *M*<sub>1</sub> slightly longer than its petiole, cell *M*<sub>1</sub> at base nearly twice as wide as at margin.

Abdominal tergites and hypopygium brownish yellow; sternites clearer yellow. Male hypopygium (Fig. 6) with the caudal margin of tergite, *9t*, virtually transverse, with two narrow submedian lobes that are separated from one another by a narrow median notch; lobes with conspicuous blackened setae, their punctures continued basad to opposite bottom of notch. Dististyle, *d*, irregular in outline, of peculiar conformation, as shown. Lobe of notch of ninth sternite, *9s*, a depressed pale spatula.

Habitat: Trinidad.

Holotype, ♂, Fyzabad, June 10, 1929 (N. A. W.); through Parish.

The most similar species is *Tipula urophora* Alexander, of Colombia and Ecuador, which differs conspicuously in the details of structure of the male hypopygium, and less evidently in the coloration of the body and wings.

*Orimarga (Orimarga) nigroapicalis*, sp. n.

Belongs to the *pallidibasis* group; mesonotal praescutum gray, paling to whitish on margins; pleura pale ventrally, with a conspicuous blackened dorsal stripe; halteres uniformly pale; femora brownish yellow, the tips broadly black; tibiae dirty white to brownish white, the extreme bases narrowly white, the tips black; wings brownish yellow, veins brownish yellow, poorly visible against the ground; *R*<sub>1-2</sub> very long, exceeding *R*<sub>2-3</sub>; *m-cu* about its own length before fork of *M*; abdomen dark brown, the caudal borders of segments, especially the sternites, more yellow.

Female. --- Length, about 10 mm.; wing, 7.2 mm.

Rostrum and palpi black. Antennae with scape black, pedicel obscure yellow; flagellum broken. Head light gray, the posterior vertex a very little darker; anterior vertex narrow, less than the diameter of scape.

Pronotum pale gray above, dark on sides; pretergites white. Mesonotal praescutum gray, paling to whitish on margins; posterior sclerites of notum light gray, the mediotergite darkened. Pleura with a conspicuous black dorsolongitudinal stripe

extending from the cervical sclerites, across the propleura, to and including the anepisternum; beyond this point paler and ill-delimited; ventral pleural areas and dorsal pleuro-tergite paler. Halteres uniformly pale yellow. Legs with the fore coxae darkened, the others pale; trochanters obscure yellow; femora obscure yellow basally, passing into brownish yellow, the tips broadly and conspicuously black; tibiae dirty white to brownish white, the bases narrowly clear white, the tips broadly black, in amount subequal to the darkened femoral tips; posterior tibiae and all tarsi clearer white. Wings with a brownish yellow tinge, slightly clearer on basal portions but not abruptly whitened, as in *pallidibasis*; veins brownish yellow, poorly visible against the ground. Venation:  $R_s$  relatively short, subequal to  $R_{-3}$ ;  $R_{1-2}$  very long, exceeding  $R_{2-3}$ ;  $m-cu$  about its own length before fork of  $M$ .

Abdomen dark brown, the caudal borders of the segments, especially of the sternites, more yellow.

Habitat: Panama (Chiriqui).

Holotype, ♀, Potrerillos, altitude 3,000 feet, May 14, 1935 (MacSwain).

*Orimarga (Orimarga) nigroapicalis* is allied to *O. (O.) excessiva* Alexander, of Venezuela, and *O. (O.) pallidibasis* Alexander, of Amazonian Peru, differing from both in the coloration of the body and wings. In *excessiva*, the wings are uniformly suffused with brown, with the veins conspicuous and well-delimited against the ground; in *pallidibasis*, the cells beyond the arculus are weakly darkened, the prearcular field is abruptly white.

*Epiphragma (Epiphragma) amphileuca*, sp. n.

General coloration of mesonotum reddish brown, the borders broadly and conspicuously black; antennae yellow, with four subterminal segments blackened, the two outer segments long, white; pleura black, with a conspicuous, dorso-longitudinal pale stripe; halteres with knobs infuscated; legs yellow; wings brownish yellow, with a darker brown ocelli-form pattern; abdomen brownish black; male hypopygium with the interbases very strongly recurved at their apices; aedeagus narrowed outwardly, the apex deeply split into two slender lobes that are separated by a long-oval notch.

Male. — Length, about 7.5 mm.; wing, 8 mm.; antenna, about 1.6 mm.

Rostrum and palpi brown. Antennae short, 14-segmented, the fusion-segment of flagellum short; basal segments yellow,

the terminal two flagellar segments white, with the preceding four segments (nine to twelve, inclusive) brownish black; flagellar segments elongate, with long conspicuous verticils; two outermost segments longer than the others. Head buffy brown, with a capillary, more or less impressed dusky median vitta.

Pronotum narrowly black in front, broadly obscure white behind, this color continued caudad onto the lateral pretergites and dorsopleural region as a conspicuous, pale, dorsolongitudinal stripe. Mesonotal praescutum reddish brown, the cephalic and lateral margins broadly and conspicuously black; a capillary median dark vitta on praescutum and less evident shorter lateral lines before suture; scutal lobes reddish brown; scutellum dark, a little brightened at base, parascutella blackened; mediotergite dark, with a pale V-shaped pattern, this being a posterior extension of the pale dorsal stripes. Pleura abruptly black, the color including all but the narrow apices of all coxae. Halteres with stem pale, apices of knobs infuscated. Legs with coxae as described; trochanters whitish; femora obscure yellow, virtually unpatterned, the extreme tips a little more whitish; remainder of legs light yellow. Wings with the ground color brownish yellow, the prearcular and costal portions somewhat clearer yellow; cubital and outer radial fields with the ground more washed with brown; a conspicuous, darker brown, ocelliform pattern, with rings centering of  $R_s$ , anterior and posterior cords, fork of  $M_{1+2}$ , and brokenly at arculus; stigma solidly darkened; longitudinal veins beyond  $M_1$  with a brown marginal spot bordered by pale, the latter delimited by a more or less complete brown semicircle; a single dark cloud in cell  $Cu$  beyond midlength, excluding the outer darkenings, cell  $2nd\ A$  with about six linear marginal dashes; veins obscure yellow, darker in the clouded areas. Venation:  $m-cu$  at near one-third the length of cell  $1st\ M_2$ .

Abdomen brownish black; hypopygium somewhat brightened. Male hypopygium with the tergal lobes conspicuous, separated by a broad V-shaped notch. Outer dististyle with apical spine strongly recurved, before apex on outer margin with a low roughened flange, with additional tubercles. Inner dististyle longer, appearing as a conspicuous flattened blade with apex obtusely rounded. Interbase with tip very strongly recurved into an apical spine, resembling a shepherd's crook. Aedeagus narrowed outwardly, at apex split into two slender

lobes, separated by a long-oval incision, the tips of lobes contiguous.

Habitat: Panama (Chiriqui).

Holotype, ♂, Potrerillos, altitude 3,000 feet, May 20, 1935 (MacSwain).

*Epiphragma (Epiphragma) amphileuca* is very distinct from the numerous other Neotropical members of the genus. The antennal pattern, unmarked legs, and structure of the male hypopygium, especially of the interbase and aedeagus, furnish the most significant characters for differentiation of the species

*Epiphragma (Epiphragma) inaequicincta*, sp. n.

General coloration of mesonotal praescutum reddish brown; antennae black, the basal and apical segments of flagellum pale; pleura brownish black; halteres dusky; fore coxae pale at base and apex, narrowly ringed with dark brown at midlength; middle and posterior coxae dark brown, their tips yellow; femora obscure brownish yellow, beyond midlength darkening to an ill-defined ring; a broad black subterminal ring, preceded and followed by much narrower yellow annuli; tibiae and tarsi yellow; wings pale brown, variegated by dark brown areas that are narrowly bordered by yellowish white; abdominal tergites black; male hypopygium with the tergal lobes triangular, their tips pointed.

Male. — Length, about 9-10 mm.; wing, 8-9.5 mm., antenna, about 2-2.2 mm.

Rostrum brown; palpi black. Antennae relatively short, black; basal fusion segment of flagellum light yellow; terminal segment paling to white; flagellar segments elongate-cylindrical, with long verticils. Head reddish brown, the vertex with a narrow dark brown median line that is expanded on the posterior vertex and occiput.

Pronotum reddish brown, with a capillary dark vitta. Mesonotal praescutum chiefly covered by reddish brown stripes, the broad lateral margins and a capillary median line dark brown; scutal lobes and scutellum dark reddish brown; mediotergite dark, pruinose. Pleura brownish black, variegated by sparse patches of gray pruinosity. Halteres dusky, the base of stem restrictedly paler. Legs with the fore coxae pale at base and apex, with a narrow dark ring at midlength; middle and posterior coxae dark brown, the tips pale yellow; trochanters obscure yellow; femora obscure brownish yellow on

more than basal half, a little darker outwardly to form a vague dark ring beyond midlength of segment; outer portion of femora clear yellow, including the apex and an equal subterminal ring, these latter enclosing an unusually broad black annulus; tibiae and tarsi yellow, the former a trifle darker. Wings with the ground color pale brown, variegated by dark brown areas that are narrowly bordered by yellowish white; dark areas appearing chiefly as more or less complete cross-bands, the first postarcular, extending from C to vein 1st A; second band virtually traversing the wing, with an ocelliform ring at origin of Rs; third band at cord; in the paratype, the dark marginal areas are broken into spots; in holotype, these more extensive and continuous in cells near wing-tip; veins brown, a little paler in the ground areas. Venation: *m-cu* more or less oblique, more than its own length beyond fork of *M*.

Abdominal tergites black; sternites paler, variegated near outer lateral portions by paler. Male hypopygium with the lobes of tergite triangular, with pointed tips, separated by a V-shaped notch. Inner dististyle broad, the apex obtuse. Interbase with tips recurved into acute points.

Habitat: Panama, Costa Rica.

Holotype, ♂, Potrerillos, Chiriqui, Panama, altitude 3000 feet, May 20, 1935 (MacSwain). Paratype, ♂, Cahuita, Costa Rica, at sea-level, December 11, 1920 (Axel Olsson).

Other species of *Epiphragma* with the ground color of the wing pale brown, the dark areas bordered by pale yellow, including *Epiphragma* (*Epiphragma*) *fabricii* Alexander and *E. (F.) sackeni* Williston, are readily told by the coloration of the mesonotal praescutum and legs, and by the unbrightened terminal segment of the flagellum.

*Epiphragma* (*Epiphragma*) *immaculipes*, sp. n.

Mesonotum reddish brown, the lateral margins darker; antennae with fusion segment of flagellum orange-yellow, the remainder of flagellum black; a transverse, obscure yellow, band across anterior half of scutum and extreme posterior portion of praescutum; pleura variegated dark brown and gray; halteres dusky; legs brownish yellow, the femora not or scarcely brightened at tips; wings grayish subhyaline, heavily patterned with brown; areas in costal cell solidly darkened, with narrow, darker brown borders; two brown areas in cell 2nd A, additional to the one at end of the

vein; abdominal tergites dark brown, the caudal margins narrowly grayish.

Male. — Length, about 10-10.5 mm.; wing, 12 mm.; antenna, about 3 mm.

Rostrum gray pruinose; palpi brownish black. Antennae with scape brownish black, gray pruinose; pedicel brownish black; fusion segment of flagellum orange yellow, remainder of flagellum brownish black. Head reddish brown, variegated on vertex by dark brown, forming a median line that is more or less dilated at anterior end and again at midlength to form cross areas.

Pronotum buffy, narrowly dark brown on central portion of anterior notum. Mesonotal praescutum chiefly covered by reddish brown stripes that become more grayish brown on posterior half of sclerite, the lateral borders and humeral region blackish brown; a narrowly transverse obscure yellow band across the anterior half of scutum, likewise involving the extreme posterior portion of praescutum before suture; scutellum dark brown, the posterior border paler; mediotergite very narrowly dark brown on anterior border, the posterior third similarly darkened, the broad intermediate section more gray pruinose. Pleura variegated dark brown and gray, the dorsal half chiefly brown, the ventral portion more grayish, each variegated by the opposite color. Halteres dusky, the base of stem yellow. Legs with the coxae gray, the outer ends dark brown; trochanters obscure yellow; femora brownish yellow, darker outwardly, in cases with the extreme tips a little brightened; tibiae obscure yellow, the extreme base whitened; tarsi yellow, the outer segments a little darker. Wings grayish subhyaline, heavily patterned with brown, the areas very insensibly bordered by clearer subhyaline; dark markings in costal field narrowly bordered by still darker brown; dark areas in cell *C* without pale centers, as in *solatrix*; pattern of wing much as in *solatrix* but with two brown areas in cell *2nd A*, additional to the cloud at the tip of vein *2nd A*; veins brown, a little paler in the ground areas. Venation:  $Sc_2$  unusually long; vein  $R_3$  extended, cells  $R_2$  and  $R_4$  at margin subequal in extent or the latter a very little longer; *m-cu* at near basal fifth of cell *1st M*<sub>2</sub>.

Abdominal tergites dark brown, the caudal margins narrowly grayish; sternites testaceous yellow, the outer segments darkened laterally; hypopygium brownish yellow. Male hypo-



pygium with the lobes of tergite pointed at apex. Interbases sinuous, the tips recurved into spines.

Habitat: Panama (Chiriqui).

Holotype, ♂, Potrerillos, altitude 3,000 feet, May 14, 1935 (MacSwain).

*Epiphragma* (*Lipphragma*) *immaculipes* somewhat resembles *E. (E.) solatrix* (Osten Sacken), in the general pattern of the legs and wings but is a distinct species. The pattern of the mesonotum, pleura and abdomen, as well as the details of distribution of wing markings, readily separate the two flies.

*Polymera* (*Polymera*) *chiriquiensis*, sp. n.

Mesonotum reddish brown, the dorsal pleurites abruptly black; antennae of male black, approximately twice the length of body; femora pale brown, a little more darkened before the extreme tips which are vaguely brightened; tarsi obscure yellow; wings with a brown tinge; *Sc* relatively short, *Sc*<sub>1</sub> ending before fork of *R*<sub>2+3+4</sub>, the latter short, about one-third the length of either *Rs* or *R*<sub>2+3</sub>; *m-cu* beyond fork of *M*.

Male. -- Length, about 4 mm.; wing, 5 mm.; antenna, about 8 mm.

Female. -- Length, about 5 mm.; wing, 5.5 mm.

Rostrum and palpi black. Antennae (male) black throughout, approximately twice the length of body; flagellar segments binodose. In female, antennae much shorter, as usual in genus. Head dark gray.

Mesonotum rich reddish brown, virtually unmarked, the pretergites obscure yellow. Pleura on dorsal portion occupied by a broad black longitudinal stripe extending from the cervical region to the abdomen, passing beneath the root of halteres; ventral pleura and sternum abruptly light yellow. Halteres with stem pale, knob weakly darkened. Legs with the coxae and trochanters pale yellow; femora pale brown, a little darker immediately before the vaguely brightened extreme tips; tibiae pale brown, the tips narrowly darkened; tarsi obscure yellow, the outer segments darkened. Wings with a brownish tinge; veins and macrotrichia darker. Venation: *Sc* relatively short, *Sc*<sub>1</sub> ending before fork of *R*<sub>2+3+4</sub>, the latter short, about one-third the length of either *Rs* or *R*<sub>2+3</sub>; *m-cu* distinctly beyond fork of *M*.

Abdominal tergites brownish black; sternites more brownish yellow; hypopygium black.

Habitat: Panama (Chiriqui).

Holotype, ♂, Potrerillos, altitude 3,000 feet, May 15, 1935 (MacSwain). Allotopotype, ♀

*Polymera (Polymera) chiriquiensis* is most similar to *P. (P.) inornata* Alexander and *P. (P.) pulchricornis* Alexander, both of British Guiana. It is distinguished from the former by the conspicuous black pleural stripe and by the venation, especially the very short  $R_2$  3-4, the latter species has the tarsi brown and vein  $R_{2-3-4}$  is relatively long, approximately one-half the length of  $R_s$ .

*Leucholabis (Paratropesit) placabilis*, sp. n.

General coloration black, with strong purplish reflexions; pronotum yellow; pteropleural and meral regions pale; knobs of halteres yellow; fore femora with more than outer third black, the remainder of femora yellow; wings subhyaline, banded with brown, including a broad apical fascia and a narrower one at cord; vein  $R_3$  erect; cell 1st  $M_2$  long and narrow; a long fusion of veins  $R_5$  and  $M_{1-2}$ ; abdominal segments black, the caudal margins of tergites narrowly yellow, of the sternites more broadly so.

Female. -- Length, about 6.5 mm.; wing 5.7-5.8 mm.

Rostrum dark brown; palpi black. Antennae with scape and pedicel brownish yellow, flagellum black; flagellar segments long-oval. Head black, the front and anterior vertex more reddish brown to yellow.

Pronotum light yellow, its scutellum black. Mesonotum black, with strong purplish reflexions, the posterior lateral angles of the scutal lobes pale yellow. Pleura purplish black, the dorsopleural membrane pale; pteropleurite whitish, with pale setae; meral region pale yellow. Halteres black, the knobs white. Legs with the fore and middle coxae yellow, posterior coxae black; trochanters yellow; fore femora yellow on more than basal half, the dilated apical portion black; tibiae and tarsi black; middle and hind femora and tibiae yellow; basitarsi brownish yellow at proximal end, the remainder of tarsi black. Wings (Fig. 4) with the ground color subhyaline, banded with pale brown, including a narrow band at cord, beginning at the darker brown stigma, together with an apical fascia whose inner edge lies at  $m$  and  $R_3$ ; a weak darkening at arculus and in basal portion of cell  $Cu_1$ ;

veins pale brown, darker brown in the clouded portions, Sc more yellow. Venation:  $Sc_1$  ending opposite origin of  $R_s$ ;  $R_2$  very close to fork of  $R_s$ , in cases, slightly before the fork; vein  $R_8$  erect; a long fusion of veins  $R_5$  and  $M_{1-2}$ ; cell 1st  $M_2$  long and narrow, nearly as long as cell  $R_5$  beyond it;  $m-cu$  at fork of  $M$ .

Abdomen black, the tergites with their caudal borders narrowly pale yellow, much more extensive on the sternites where more than the distal half is included; genital segment yellow.

Habitat: Costa Rica.

Holotype, ♀, Pedregoso, Valley of the General, altitude 2,075 feet, January 1939 (Rounds). Paratopotype, ♀, altitude 2,300 feet.

Allied to *Teucholabis* (*Paratropesa*) *collaris* (Osten Sacken) and similar forms, differing in the coloration of the body, legs and wings, and in the venation, especially the long narrow cell 1st  $M_2$  and the erect vein  $R_8$ .

*Teucholabis* (*Teucholabis*) *hondurensis*, sp. n.

General coloration reddish, heavily patterned with black; antennae black throughout; head dark gray; mesonotal praescutum almost covered by black stripes; scutellum and postnotum black; halteres with apex of knob pale yellow; legs with the femora obscure yellow, blackened at tips; posterior tibiae (male) with a slightly swollen black ring at near mid-length; wings pale yellow, slightly patterned with pale brown, appearing as ill-defined bands;  $Sc$  long; abdomen with tergites and hypopygium black, the sternites more reddish; male hypopygium with the apical lobe of basistyle a strong curved spine clothed with abundant setae; aedeagus bearing a slender curved black spine.

Male. — Length, about 7 mm.; wing, 7.5 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments oval to long-oval. Head dark gray; anterior vertex relatively narrow.

Pronotum and pretergites obscure orange yellow. Mesonotal praescutum chiefly polished black, the humeral region obscure yellow, prolonged into poorly indicated interspaces that separate the ground areas except near the suture; scutal lobes black, the median area deep reddish brown; scutellum black, parascutella brownish black; postnotum black. Propleura

reddish. Mesopleura black, the meral and adjoining regions more reddish; ventral pleurites with a poorly indicated grayish longitudinal stripe, comprised of appressed setae. Halteres brown, the apex of knob pale yellow. Legs with coxae weakly blackened on outer face, more reddish behind and beneath; trochanters yellow; femora obscure yellow, the tips blackened; tibiae obscure yellow, the tips passing into black; posterior tibiae with a slightly swollen blackened ring at and just beyond midlength; tarsi black. Wings (Fig. 5) with a very pale yellow ground color, slightly patterned with pale brown, including a narrow, more or less broken band at level of origin of *Rs*, one at the cord, and a third band that includes the narrowly darkened wing-tip in the outer radial field; outer end of cell *1st M*<sub>2</sub> and veins beyond it more narrowly scamed with pale brown; stigma oval, darker brown; veins brown, more brightened at extreme wing-base. Venation: *Sc* long, *Sc*<sub>1</sub> ending nearly opposite three-fifths the length of *Rs*, *Sc*<sub>2</sub> a short distance from the tip of *Sc*<sub>1</sub>; *R*<sub>2</sub> subequal to *R*<sub>2+3+4</sub>; anterior branch of *Rs* generally parallel to posterior branch until outer end; *m-cu* about one-third its length beyond fork of *M*.

Abdominal tergites black, the caudal borders of intermediate segments vaguely more reddish; basal sternites more reddish; hypopygium black. Male hypopygium (Fig. 7) with apical lobe of basistyle, *b*, a powerful, broad-based spine that is very strongly bent upon itself, the apex acute and blackened; surface of lobe with abundant long delicate setae. Outer dististyle, *od*, a long gently curved rod that narrows to a short black point, on outer margin at near one-third the length with a stout blackened spine or spinous flange. Inner dististyle with outer blade bidentate, the teeth widely separated. Acdeagus, *a*, bearing a wide flange that is produced outwardly into a long curved black spine, more basally bearing three very long and one smaller setae.

Habitat: Honduras.

Holotype, ♂, Minas de Oro (J. B. Edwards); Museum of Comparative Zoölogy, Cambridge.

*Teucholabis (Teucholabis) hondurensis* is allied to *T. (T.) oteroi* Alexander, and related forms, differing conspicuously in the coloration of the body, legs and wings, and in the structure of the male hypopygium.

**A new *Velia* from Trinidad (Hemiptera)**

by C. J. Drake &amp; H. M. Harris, Ames, Iowa

The new species of water-strider described below was collected in the narrow reaches of small streams of flowing water in the eastern part of Trinidad, B. W. I. The types are in the collection of the authors.

*Velia tersa*, sp. nov.

Moderately large, slender, with fairly long legs. Chocolate brown, the head, antennae and connexivum paler. Legs pale, banded with brown. A large, somewhat triangular spot on each side of pronotum in front and the wing pads silvery, clothed with recumbent, silky, scale-like hairs. Head light brown, paler on each side next eyes and along the fine median impressed line in front. Antennae inconspicuously clothed with short, rather even, fine hairs; testaceous, the distal two segments darker; proportions, 25 : 20 : 15 : 13.

Pronotum longer than broad, angularly rounded behind, with a distinct median ridge; coarsely punctate, the punctures rather silvery. Abdominal dorsum somewhat shiny, clothed with fine, recumbent, golden hairs. Connexiva produced at apex into slender, sharp, brown spines. Sides of thorax and venter pale brown, with conspicuous, darker, irregular, shiny, sunken areas. Acetabula pale. Mesosternum rather chordate. Abdominal venter pale, darkened down the middle; with transverse impressed lines along basal margins of all segments and also on disc of first five segments. Connexival margin as viewed from the side with a row of about thirty-eight stridular pegs extending from thorax to base of fourth segment. Posterior femora relatively slender, but rather sharply enlarged on distal half, armed within along swollen portion with four or five small, prominent teeth and a few spinules; provided near base with a large stridular area.

Length, 4.70-5.00 mm.; width, 1.10-1.35 mm.

Holotype: apterous male and allotype, apterous female; Trinidad, B. W. I., taken in a small stream near the eastern coast of the Island, October 29-31, 1938 by Carl J. Drake. Paratypes, many males and females taken with type.

This pretty species belongs to the subgenus *Stridulivelia* and superficially resembles *V. cinctipes* Champion. It is

smaller, however, and not so conspicuously hairy, the legs are more slender, the hind trochanter is unarmed, the hind femora are less incrassate and are provided with stridular patches, the wing pads are noticeably larger and the pronotum is distinctly angular basally. In the male the last ventral segment does not slope so much posteriorly as in *vinetipes*, but ends more abruptly and the first genital segment is rather strongly constricted basally somewhat as in *V. stridulata*. The male clasper is somewhat like that of *V. strigosa* but is more strongly expanded distally. The transverse impressed lines on the ventral segments are progressively shortened from the base so that the one on segment five is quite short.

### New fly parasites of *Diatraea* in São Paulo

by Charles H. T. Townsend, Itaquaquecetuba, S. Paulo

In the course of recent work carried out here by Dr. Harry L. Parker, head of the United States Bureau of Plant Quarantine laboratory in Montevideo, two new species of flies and one already described species whose parasitism was hitherto unknown have been reared from *Diatraea* in maize.

#### *Parthenoleskia*, gen. nov.

Genotype, *P. parkeri*, sp. nov. São Paulo Female only.

Runs out with *Urmyobia*, from which it differs as follows: Epistoma about 1/4 clypeal length, V decussate, haustellum 3/4 head height and the bowed spatulate palpi nearly as long, antennal axis 3/4 head height, third antennal joint little over twice second, arisal hairs 2 to 3 times as long as basal diameter of arista, eyes nearly reaching vibrissal level, vertex nearly 2/7 head width and front at lunula little over 1/3, face faintly widening below and over 1/3 head width on middle, 2 FRS below bases antennae, IVRS and front RFRO pair strongly decussate, PFR() set well back, frontalia under parafrontal width, cheeks 1/4 eye length. Three PRA with hind pair close on suture, 2 PA and 2 very weak anteriorly, 3 PS and a fourth short anteriorly, hind PRI small,

2 PRSA nearly in line, only 2 ST and both strong, tips of HLS meeting. Stigma nearly as long as radiocosta, post-stigma 3 times stigma, 5R well open just before wing tip, 3 to 4 bristles at base of R5, M1 irregularly arcuate inward, short stump of M2 little out of line with latter but directed to hind wing margin, M3 fully its length from cubitulus and the latter little over a right angle but more than  $1/4$  wing width from hind margin. Abdomen very long oval and much longer than thorax.

*Parthenoleskia parkeri*, sp. nov.

1 female, Itaquaquecetuba, reared from *Diatraea saccharalis*, issued Jany. 27, 1941 (Nathaniel O. Townsend).

Length, 9 mm. Head silvery, hind  $1/2$  of parafrontalia golden, frontalia brown, antennae and palpi fulvous, third antennal joint brownish terminally. Scutum and scutellum golden, thoracic vittae linelike and faint, pleura silvery. Abdomen yellow fulvous, hind border of segments blackish or brown, first segment most narrowly and third most widely so, intermediate segments with median brown spot on hind half. Legs yellow, tibiae a little dusky, tarsi black. Wings clear, squamae tawny whitish.

Named in honor of Dr. Harry L. Parker, under whose direction the species was reared, his number for same being 300 x.

The puparium is elongate and the gently protuberant anal stigmata are nearly in line with the dorsal surface.

*Palpozenilla diatraeae*, sp. nov.

1 female and 2 males, Itaquaquecetuba, reared from *Diatraea saccharalis*, issued Jany. 25, 1941 (Nathaniel O. Townsend).

Length, 7 mm. Differs from *P. palpalis* Ald of British Guiana as follows: Male third antennal joint 5 times second, eyes thinly haired, female vertex  $1/3$  head width, 1 or 2 FRS below bases antennae, female frontalia distinctly less than parafrontal width, 3 PRA, 2 PAL and front one shorter, APS suberect and strongly decussate to bases, M1 only faintly arcuate inward, M3  $3/5$  way to cubitulus, no MM on first segment, no MD on second, MR and DR on fourth.

Scutellum silvery, abdominal pollen thin and wholly silvery, hind tibiae rather thinly pectinate with 1 longer bristle near middle, wings clear, squamae white. — The thinly bristled to setose rufofulvous female palpi are different in outline from the Aldrich figure by Greene, but have a deep pit just before extreme tip on outer side, the pit mouth being elliptic. Male palpi lack pit and are not swollen. The second antennal joint and under inner base of third are dull rufofulvous. The pleura are silvery. The two black thoracic vittae are the linelike inner vitta approximated to the outer but showing golden between them anteriorly.

The genotype is larger and parasitizes *Castnia* in Venezuela and the Guianas.

*Nepophasmophaga facialis* TT was reared in numbers from the *Diatraea* and dissection of females indicates that it deposits micro eggs on tender shoots which are eaten by young *Diatraea* before entering the stalks.

#### Addendum

*Parth noleskia parker* TT male: Vertex 1.5 head width, front widening forward and face downward almost uniformly, front at lunula about 2.7 and face on middle about 2.5 head width, 3 FRS below bases antennae, no RFRO, no short fourth PS anteriorly, 3 ST with the lower FST only a little shorter than the upper, no MM on first segment, tarsi very elongate and claws long. — Coloration same as the female except dark parts of abdomen much less pronounced, the first segment with scarcely a trace of the darker hind border. (From a single male, which becomes the allotype, issued February 16, 1941).

#### Monograph of the South American Mutillid genus *Hoplocrates* Mickel (Hymenoptera: Mutillidae)\*)

by Clarence E. Mickel, University of Minnesota

The South American species of Mutillidae constituting the genus *Hoplocrates* Mickel are perhaps more bizarre

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in appearance than any others in the South American fauna, with the exception of the related genus *Atillum* André, which in many respects resembles *Hoplocrates*. Both sexes have enormous quadrate heads, much wider than the thorax, with conspicuous processes projecting from the genae and the hypostoma, although the size of the head in relation to the thorax is much greater in the females than in the males. The second abdominal tergite of the female is maculated conspicuously with a median spot of appressed pubescence which may be cupreous, golden or pale (silvery white), which may vary in size and shape from rhomboidal and extending from the anterior margin almost to the posterior margin, to linear and extending from the anterior margin only slightly beyond the transverse median line. The females of *Hoplocrates* and the related genus *Atillum* are the only Mutillid females known to me which possess thirteen segments in the antennae. The wing venation of the males is uniform throughout and presents one or two characteristic features; the stigma is rudimentary, almost absent; three veins arise from the vein forming the posterior boundary of the marginal cell, the proximal one closes the first submarginal cell, the median one does not completely close the second submarginal cell, but extends only half the distance to the vein forming the posterior boundary of that cell, and the distal one arises towards the postero-outer angles of the marginal cell, extends in a gentle curve towards the margin of the wing, and gradually fades out before reaching the margin. All the males are entirely black, maculated sparingly with pale appressed pubescence.

The related genus *Atillum* differs from *Hoplocrates* as follows: females with the first and second abdominal segments entirely sessile and the pubescent maculations of the body composed of coarse hairs, while in *Hoplocrates* the first abdominal segment is nodose and diskiform, and the pubescent maculations of the body are composed of fine to moderate appressed hairs; males of *Atillum* with maculations of body composed of coarse hairs as in the females, and wings with only two veins arising from posterior margin of marginal cell, the first closing the first submarginal cell and the second rising almost adjacent to it and extending in a gentle curve towards the margin of the wing.

*Hoplocrates* is strictly a South American genus. Two of the specimens available for study are labeled as having been collected in Costa Rica (one specimen) and Mexico (one specimen), but these specimens were obviously mislabeled. Only one species is recorded once from Panama, *moneta* Gerstaecker by Blake under the name *quadridens* Blake. The center of distribution of the genus appears to be Brazil from which twenty-two species are recorded; the range extends east and west from the Atlantic to the Pacific oceans, and north and south from Colombia and Venezuela to Bolivia, Paraguay and the extreme northern edge of Argentine Republic. One species is known from Trinidad, B. W. I. A geographical catalogue of species concludes this paper.

The species of *Hoplocrates* are presumably parasites of other wasps and bees like other Mutillidae, but not a single host is known. Exact knowledge of their biology therefore remains to be worked out.

The types of all the previously described species have been studied and in most cases specimens were compared with types to insure accurate and authentic determinations. Three hundred and fifty-three specimens of females and fifty-one specimens of males have been available for study. This number is apparently small but it represents practically all the material available in the collections of the world and is not only an indication of the rarity of the genus as a whole, but also the scarcity of males in relation to the females. A part of this apparent rareness may be due to the remoteness of the habitats where the species are found. The commonest species in collections are the females *cephalotes*, *monacha* and *pompalis*, each of which were represented by sixty or more specimens in the material studied, and the males *mystica*, *erythropsis*, and *scutellaris* represented by ten or more specimens each. All of the data accompanying the specimens is itemized herein and the present location of each specimen is indicated in brackets following the citation of other data concerning the specimen. To conserve space letters are used to designate institutional and individual collections as follows:

- A.E.S. American Entomological Society, Philadelphia Academy  
of Sciences, Philadelphia, Pa.  
A.M.N.H. American Museum of Natural History, New York, New  
York.  
B.M. British Museum (Natural History), London.

C.M.	Carnegie Museum, Pittsburgh, Pa.
C.U.	Cornell University, Ithaca, New York.
D.E.I.	Deutsches Entomologisches Institut, Berlin-Dahlem, Germany
D.V.F.	D. Vesev FitzGerald, Clammer Hill, Haslemere, Surrey, England.
F.I.	Marchesi Fabio Invrea, Genoa, Italy.
G.S.	Dr. George Salt, Zoological Laboratory, Cambridge, England.
H.N.M.	Hungarian National Museum, Budapest, Hungary.
I.A.S.P.	Instituto Agronomico do Estado São Paulo, Campinas, Brazil
I.B.	Instituto Biologico, São Paulo, Brazil.
I.C.A.	Imperial College of Tropical Agriculture, Trinidad, B W I
I.O.C.	Instituto Oswaldo Cruz, Rio de Janeiro, Brazil
M.C.S.N.	Museo Civico di Storia Naturale, Genoa, Italy.
M.C.Z.	Museum of Comparative Zoology, Cambridge, Mass
M.N.H.N.	Muséum Nationale d'Histoire Naturelle, Paris, France.
M.N.B.A.	Museo Nacional, Buenos Aires, Buenos Aires, Argentine Republic.
M.P.	Museu Paulista, São Paulo, Brazil.
M.Z.A.	Museo Zoologia et Anatomia comparata della R. Università, Turin, Italy
N.S.	Naturhistorisches Staatsmuseum, Vienna, Germany
P.M.	Peabody Museum, Salem, Mass.
S.C.	Saunders Collection, Oxford University, Oxford, England.
U.H.	Zoologisches Institut der Universität, Halle a. Saale, Germany.
U.M.	University of Minnesota, St. Paul, Minnesota
U.S.N.M.	United States National Museum, Washington, D.C.
Z.M.	Zoologisk Museum, Copenhagen, Denmark
Z.M.H.	Zoologisches Institut und Zoologisches Museum, Hamburg, Germany
Z.M.U.	Zoologisches Museum der Universität, Berlin, Germany.
Z.SS.	Zoologische Staatssammlung, Munich, Germany

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### Genus *Hoplocrates* Mickel

- Mutilla* (Section B, in part) Klug, 1821, N. Acta Acad. Caes. Leopold. Carol. nat. cur., vol. 10, pt. 2, p. 313.  
*Mutilla* (Section II, species 23-26, Burmeister, 1854, Abh. Naturf. Ges. Halle, Sitzb., 1854, pp. 25-26.  
*Mutilla* (Group *cephalotes*, in part, species 1-9 only) Gerstaecker, 1874, Arch. f. Naturg., vol. 40, pp. 46-48.  
*Mutilla* (Division Megalocratinae, subdivision Pendulae) Burmeister, 1875, Bol. Acad. nac. Ci. exact. Univ. Cordova, vol. 1, pp. 479-481.  
*Mutilla* Blake, 1879, Trans. Amer. Ent. Soc., vol. 7, p. 247 (in part, *Mutilla quadridens*).  
*Sphaerophthalma* Blake, 1886, Trans. Amer. Ent. Soc., vol. 13, p. 247 (in part, *S. quadridens*).  
*Sphaerophthalma* Cameron, 1894, Biol. Cent. Amer., Hymen., vol. 2, p. 317 (in part, *S. quadridens*).  
*Mutilla* Dalla Torre (in part), 1897, Catalogus Hymenopterorum, vol. 8, p. 5.  
*Mutilla* Cresson (in part, females, species 25-30, males, species 17) 1902, Trans. Amer. Ent. Soc., vol. 28, pp. 25-29, 67.  
*Hoplomutilla* André (nec Ashmead, 1899), 1903, Genera Insectorum, fasc. 11, pp. 46-47.  
*Hoplomutilla* Ashmead (nec Ashmead, 1899), 1904, Can. Ent., vol. 36, pp. 7 and 8.  
*Hoplocrates* Mickel, 1937, Rev. Ent. Rio, vol. 7, pp. 198-200.

Genotype: *Mutilla cephalotes* Swederus, by original designation.

Diagnostic characters of the females: Head exceedingly large, quadrate, always much broader than the thorax; antennae composed of thirteen segments; first segment of flagellum always very long, always distinctly longer than the flagellar segments two and three united, and sometimes almost as long as flagellar segments two to four united; antennal scrobes distinctly to strongly carinate above; head armed beneath with four dentiform processes, one pair on the genae, the second pair at the hypostoma; eyes relatively small, entire, ovate moderately convex, with distinct facets; thorax subpyriform to subrectangular, the anterior spiracular tubercles prominent and subdentate to dentate; scutellar scale entirely absent; posterior margin of mesosternum with a broad, lamellate process extending between the posterior coxae and beyond the anterior margin of the first abdominal sternite; first abdominal segment subsessile, more or less diskiform, the first tergite usually with anterior and dorsal faces; second abdominal tergite with a median maculation of dense, appressed pubescence, the latter either pale (silvery white), golden or cupreous, and varying from narrowly cuneiform to very broadly ovate or subrhomboidal; pygidial area large, distinctly limited laterally by carinae, granulate, front, vertex, pronotum,

mesonotum and second abdominal tergite often with numerous, inconspicuous, broad, spatulate hairs intermixed with the pubescence, calcaria either dark ferruginous or black.

Diagnostic characters of males: Head very large, quadrate, as broad or broader than the thorax; anterior margin of median area of clypeus always very deeply (sometimes more than half the length of the clypeus), roundly and broadly emarginate, the anterior margin of the clypeus thus prominently bilentate; antennal scrobes distinctly to strongly carinate above; first segment of flagellum slightly longer than the second; eyes relatively small, entire, ovate, moderately convex and with distinct facets; head with four dentiform or tuberculate processes beneath, one pair on the genae and the second pair at the hypostoma; ocelli very small; scutellum always strongly and evenly convex; dorsum of propodeum, posterior face of propodeum and sides of propodeum, all rounded into one another, the dorsum without a median, enclosed space; posterior margin of mesosternum with a broad, lamellate process extending between the posterior coxae and to or beyond the anterior margin of the first abdominal sternite; tegulae relatively small, their length equal to half or less than half of the length of the mesonotum, moderately convex, glabrous and bare, except the anterior and inner margins punctate and sparsely pubescent; first abdominal segment subsessile to subnodose; last abdominal tergite with a pygidial area, the lateral margins not always distinctly carinate, usually granulate throughout; wings strongly infumated, but with a subhyaline spot covering most of the median cell and a median subhyaline spot covering most of the first submarginal and first discoidal cells; stigma rudimentary, practically absent; marginal cell broadly truncate distally, three veins arising from its posterior margin, the proximal one closing the first submarginal cell, the median one incomplete and only partially closing the second submarginal cell, and the distal one extending in a gentle curve towards the apex, but not reaching the margin; calcaria dark to black; spatulate hairs present more or less on vertex, pronotum and mesonotum but usually not obvious.

*Hoplocrates* is most closely related to *Atillum* André, both genera having thirteen segmented antennae in the females, both having large, quadrate heads in both sexes with genal and hypostomal processes beneath, and both possessing spatulate hairs intermixed in the pubescence of

certain areas on the head, thorax and abdomen. These characters distinguish both genera from the remotely related genus *Hoplomutilla* Ashm. Their affinities with the latter are indicated by the presence of the mesosternal process between the posterior coxae, and by the absent or rudimentary stigma in the wings of the males. *Atillum* differs from *Hoplocrates* in having the thorax of the females as broad or broader than long, the body of both sexes maculated with coarse, white, or orange-reddish hairs, and the males with only two veins arising on the posterior margin of the marginal cell, the vein closing the second submarginal cell being entirely obsolete.

The oldest described species of the Mutillids now assigned to *Hoplocrates* is *Mutilla cephalotes* Swederus (1787). This species together with *Mutilla armata* Klug, and twelve other species of Mutillids now placed in other genera, were arranged by Klug (1821) in his Division B. This division was described as having the eyes entire in the males, and the abdominal petiole short and distinct. Klug had no male specimens which we would now assign to *Hoplocrates*, and the two species mentioned above were placed in Division B solely on the basis of the shape of the first abdominal segment or the petiole. Burmeister (1854) created a special group for *cephalotes*, *armata* and two additional species. These four, *armata*, *miles*, *megacephala* and *cephalotes*, together with a male attributed to *megacephala*, constituted his group II, which was diagnosed as having small, oval, slightly convex eyes, an exceedingly broad head armed beneath in the females, abdomen without smooth, polished spots, the petiole short and broad. *Cephalotes* and *armata* were misidentified by Burmeister, as will be shown later, but he was the first to recognize the males of the genus, and was the first to set off these related species as a group distinct from other Mutillids, although he did not give them generic ranking. Gerstaecker (1874) corrected some of Burmeister's misidentifications, described four additional female and two males, but also included one species now assigned to *Atillum*, and segregated them as his «Gruppe der *Mut. cephalotes* Swed. and *armata* Klug». Burmeister (1875) further elevated this same group of species by giving them the rank of a subdivision *Pendulae* in his second division *Megalocratinae*; the other subdivision of the latter was proposed for those species now assigned to *Atillum*. In this last paper, Burmeister limited himself to species known from the Argentine Republic. Since he did not know any species of his subdivision *Pendulae* to occur in that country his comments are limited to a few remarks regarding Gerstaecker's corrections of his misidentifications in the paper of 1854, and the probable association of certain males and females. The one species described by Blake (1879) was placed first in the genus *Mutilla*, and later (1886) removed to *Sphaerophthalma*. Cameron (1894) cited this species again in the genus *Sphaerophthalma*. Dalla Torre (1897) recognized only the single genus *Mutilla* in his «Catalogus Hymenopterorum» and contributed nothing whatever to the clarification of generic concepts in the group. Cresson (1902) also included all the Brazilian Mutillids in the single genus *Mutilla*. The species numbered 25-30 inclusive of the females, and species no. 1 in the male section represent the genus *Hoplocrates*.

The group was actually elevated to the rank of a genus in the minds of taxonomists by Ashmead (1899), when he proposed the new genus *Hopломutilla*. Through some inexplicable error, as pointed out by Mickel (1928, 1937, 1939), he designated *Mutilla spinosa* as the genotype which entirely changed the concept of the genus and made the name apply to that group of species represented by *spinosa* Swederus. André (1903) refused to accept the designation of *Mutilla spinosa* as genotype and used the name *Hopломutilla* for *cephalotes* and relatives. Ashmead (1901), himself, attempted to change the genotype designation to *Mutilla cephalotes* Swederus. Since such a change is not permissible under the International Rules of Nomenclature, the new name *Hoplocrates* was proposed by Mickel (1937).

#### TAXONOMIC CHARACTERS

The morphological characters useful taxonomically and common to both sexes are: the large quadrate head which may vary in its development behind the eyes; a few species have the distance between the posterior eye margins and the postero-lateral angles about equal to the greatest diameter of the eyes, while others have this same distance much greater than the latter; the processes on the genae and hypostoma are subject to considerable variation in the relative size of the two pair; in some species the genal processes are longer than those on the hypostoma while in others the opposite relation prevails; the form of these processes appears to be constant for species, at least in those species where a series of specimens have been available for study, no conspicuous variation in form is to be observed; and finally the distal end of the intermediate and posterior femora may be squarely truncate with the faces of the truncations sulcate, or the distal end of the femora may be of the usual form.

The taxonomic characters limited to the females are as follows: the clypeus exhibits a tendency to be produced medially either near the posterior margin of the median area or at the transverse midline; the process thus formed may be long and tongue-like or consist merely of a pair of median tubercles, with various intergrades between these two extremes represented in different species; the anterior margin of the clypeus usually has a pair of median tubercles which may be concealed if the process is strongly developed; the postero-lateral angles of the head in one group of species are rounded or even subangulate, while in a second group they are very conspicuously angulate and often even subdentate or dentate; the pubescent markings of the head vary from entirely pale

to at least the front, vertex and genae black, although often there is a pair of dense, appressed, pale pubescent spots on the vertex and the front may occasionally be densely pale pubescent; the thorax is remarkably uniform in shape throughout the genus; one group of species has the propleura more or less striate in contrast to the nonstriate propleura of the second group; the first group also has the sides of the propodeum obliquely rugoso-punctate in contrast to the punctate sides of propodeum of the second group; usually the thorax is entirely black but a few species have the integument of the mesonotal area, and dorsum of propodeum bright ferruginous; the extent and pattern of the pale pubescent markings on the dorsum of the thorax and propodeum is also very useful in diagnosing the various species; the nature of the variations in these pale pubescent markings is brought out in the key to the females; the size, form and color of the median pubescent maculation on the second tergite is specific; the extremes in size and shape are found in *cephalotes* and *specularis* on the one hand, and in *armata* and associated species on the other; *cephalotes* has this maculation golden in color, very large, occupying almost half of the area of the tergite and transversely ovate in shape, while *specularis* has the maculation cupreous, rhomboidal and about the same area as in *cephalotes*; in *armata* on the other hand this maculation is reduced to an anterior, median, cuneiform line of pale pubescence; the various species exhibit many intermediates of shape, size and color between these two extremes.

The useful taxonomic characters in the males are as follows: the degree of development, and relative size of the genal and hypostomal processes; these vary in form and size much as in the females; the extent and pattern of pale pubescence on the front, vertex and genae is useful as pointed out in the key to the males; in some species these areas are entirely black, while in others they are almost entirely pale; the males associated with the females in the *cephalotes* group, so far as known, have the integument of the scutellum entirely ferruginous, otherwise the thorax is entirely black; the density of the pubescent markings and their extent are characteristic of some of the species; the pale pubescent markings of the abdominal segments are especially useful and they have been utilized in the key, as well as described in detail with reference to the new species.



## Subgeneric groupings

Both sexes of the known species of the genus *Hoplocrates* fall into two groups depending on the form of the distal end of the intermediate and hind femora, the sculpture of the propleura and sides of propodeum and the configuration of the postero-lateral angles of the head (see first couplet in key to the females, and key to the males). Those having the femora normal or usual in form include six species of females, two additional varieties of females and three males. *Cephalotes* Swederus is the oldest described species in this group and the name has therefore been used to designate the group. The second group, with the femora truncate, is a much larger and more widely distributed one, there being nineteen species and one variety of females, and ten species of males. *Armata* Klug is the oldest name in this group and is therefore used as a group name.

## Key to the females

- 1 Hind femora truncate distally, the surfaces of the truncations sulcate; propleura not at all striate, sides of propodeum more or less punctate; postero-lateral angles of head conspicuously angulate or subdentate 9
  - Hind femora without sulcate truncations distally, propleura more or less striate; sides of propodeum obliquely rugoso-punctate; postero-lateral angles of head rounded to slightly angulate . . . . . 2
- 2 Mesopleura, metapleura, and sides of propodeum densely pale pubescent, concealing the sculpture . . . . . 3
  - At least the sides of propodeum very sparsely pale pubescent, distinctly, obliquely striato-punctate . . . . . 4
- 3 Vertex entirely black pubescent, genae either entirely black pubescent, or with sparse, inconspicuous, pale pubescence
  - *cephalotes* (Swederus)
  - Lateral areas of vertex, and genae clothed with conspicuous, pale pubescence . . . . . *maculiceps* n. sp.
- 4 Mesonotum and dorsum of propodeum each with a pair of large, pale pubescent spots more or less approximate medially . . . . . 8
  - Mesonotum and dorsum of propodeum without paired spots, but nearly always both, rarely only the propodeum, with a pair of lateral, longitudinal, continuous, pale pubescent stripes . . . . . 5
- 5 Median, pubescent spot of second abdominal tergite extending to the anterior margin of the tergite . . . . . 6
  - Median, pubescent spot of second abdominal tergite small, subcircular, widely separated from the anterior and posterior margins of the tergite . . . . . *bellica* n. sp.
- 6 Median, pubescent spot of second abdominal tergite pale golden; vertex with a pair of narrow, linear, oblique, pale pubescent spots.
  - *smithii* (Cresson)
  - Median, pubescent spot of second abdominal tergite cupreous; vertex

- either entirely black pubescent, or with a pair of subtriangular, pale pubescent spots . . . . . 7
7. Vertex with a pair of subtriangular, pale pubescent spots; pale longitudinal stripes on thorax present from anterior margin of mesonotum to posterior margin of propodeum . . . *miles* (Burmeister)
- Vertex entirely black pubescent, without pale spots; mesonotum entirely black pubescent, the pale pubescent, longitudinal stripes of thorax present only on propodeum . . . *miles atriceps* n. var.
8. Vertex entirely black pubescent . . . . . *specularis* (Gerst.)
- Vertex with a pair of more or less distinct, pale pubescent spots . . . *specularis subtilis* n. var.
9. Genal processes distinctly longer than hypostomal processes . . . 10
- Genal processes small, distinctly shorter than hypostomal processes . . . 12
10. A sharp carina along inner margin of genal process and extending to postero-lateral angles of head, and a longitudinal area dorsal of the carina glabrous almost impunctate; transverse median line of clypeus only slightly elevated, very slightly bituberculate medially . . . . . *gratiosa* n. sp.
- Genae without a carina between the genal processes and postero-lateral angles of head, although the area between the two sometimes glabrous and sparsely punctate, transverse median line of clypeus distinctly elevated, either distinctly bituberculate or bidentate medially . . . . . 11
11. Transverse median line of clypeus strongly elevated and strongly bidentate medially, median pubescent spot of second tergite pale golden . . . . . *moneta* (Gerstaecker)
- Transverse median line of clypeus only moderately elevated and distinctly bituberculate medially . . . . . *rufonotata* (André)
12. Head and thorax above entirely black pubescent . . . . . 13
- At least the vertex with a pair of pale pubescent spots . . . 14
13. Posterior margin of clypeus produced medially into a long, porrect, tongue-like process; median, pubescent spot of second abdominal tergite large, subcircular, fulvous . . . . . *lingulatus* n. sp.
- Clypeus flat, the posterior margin not produced, the anterior margin bituberculate medially; median pubescent spot of second abdominal tergite elongate, subovate, varying from very pale yellow to fulvous . . . . . *spuniceps* (Cresson)
14. Median, pale pubescent spot of second abdominal tergite fulvous, more or less elongate subovate . . . . . 15
- Median, pale pubescent spot of second abdominal tergite pale glittering white, linear . . . . . 19
15. Hypostomal processes spatulate, transversely compressed . . . 16
- Hypostomal processes subconical or spiniform . . . . . 17
16. Distance between posterior margin of eyes and postero-lateral angles equal to approximately one and one-fourth the greatest diameter of the eyes; carina defining postero-lateral angles very high posteriorly and abruptly terminated, thus dentiform . . . . .
- . . . . . *centromaculata* (Cresson)
- Distance between posterior margin of eyes and postero-lateral angles scarcely equal to greatest diameter of eyes; carina defining postero-

- lateral angles weak, not high posteriorly nor abruptly terminated .  
*capitulata* n. sp.
17. Genae with a distinct carina extending from base of genal process to postero-lateral angles of head . . . . . *elecebra* n. sp.  
 — Genae without any such carina . . . . . 18
18. Integument of dorsum of thorax entirely black . . . *dryope* n. sp.  
 — Integument of dorsum of thorax, except the pronotum and posterior face of propodeum, ferruginous . . . . . *amoena* n. sp.
19. Posterior margin of clypeus produced medially into a porrect, tongue-like process . . . . . 20  
 — Posterior margin of clypeus not at all produced, the clypeus either flat, produced along the transverse median line, or produced at the anterior margin . . . . . 21
20. Thorax entirely black, maculated with pale pubescence . . . . .  
*monacha* (Gerst.)  
 Mesonotum and dorsum of propodeum more or less ferruginous . .  
*monacha rubella* n. var.
21. Median area of clypeus flat throughout, not at all elevated, the anterior margin very weakly bituberculate medially; antennal tubercles elevated to form a pair of strong, conspicuous teeth . .  
*pompalis* n. sp.  
 — Median area of clypeus not flat throughout, either elevated along the transverse midline, bidentate or strongly bituberculate at the anterior margin, or weakly quadratuberculate anteriorly; antennal tubercles elevated and dentate or not . . . . . 22
22. Clypeus elevated along the transverse midline and distinctly bidentate medially, the bidentate process distinctly above the elevation of the mandibles; carina bounding antennal scrobes above continued on to antennal tubercles, but the latter not dentate; median area of clypeus not margined posteriorly . . . . . 23  
 — Clypeus not elevated along the transverse midline, the surface of the clypeus at or below the mandibles; antennal tubercles elevated and dentate; median area of clypeus margined posteriorly . . 25
23. Hypostomal processes massive, subconical, but attenuated distally forming a short, slender, cylindrical process, slightly recurved laterad at the tip; last four segments of flagellum tinged with ferruginous beneath; mesonotal area pale pubescent throughout and with or without scattered, long, erect, black hairs . . . . . 24  
 — Hypostomal processes massive throughout, distinctly transverse, strongly recurved laterad and cephalad, (i.e., the tip directed toward the base of mandible); anterior surface of hypostomal processes with a glabrous stripe adjacent to inner margin, the inner margin itself broadly shallowly emarginate medially; flagellum entirely black; mesonotal area black pubescent anteriorly . . . *munita* n. sp.
24. Integument of mesonotum and dorsum of propodeum entirely ferruginous, clothed with sparse, appressed, golden pubescence, interspersed with long, scattered, erect, black hairs, and with a patch of dark, spatulate hairs on the median, posterior area of mesonotum .  
*voluptuosa* (Gerst.)

- Integument of dorsum of thorax entirely black throughout, the mesonotum and dorsum of propodeum clothed throughout with sparse, subappressed, pale, glittering pubescence, without erect black hairs and without spatulate hairs . . . . . *penithesilea* n. sp.
- 25. Anterior margin of clypeus weakly bituberculate medially, and with a pair of median, weak, submarginal tubercles posterior to those at the anterior margin, or with a pair of very strong, median, submarginal tubercles that project beyond the anterior pair . . . 26
- Anterior margin of clypeus strongly bituberculate medially, almost bidentate, and without a pair of median, submarginal tubercles .  
*armata* Klug
- 26. Median, submarginal tubercles of clypeus weak, distinctly posterior to those at the anterior margin; dorsum of thorax either entirely black, or in large part ferruginous . . . . . 27
- Median, submarginal tubercles of clypeus strong, elevated, projecting anteriorly beyond the marginal pair and somewhat concealing them; mesonotum and dorsum of propodeum in large part ferruginous . . . . . *turtarina* n. sp.
- 27. Thorax entirely black . . . . . *admirandi* n. sp.
- Mesonotum and dorsum of propodeum ferruginous . . . . . *oblectanea* n. sp.

### Key to the males

- 1. Integument of scutellum black; hind femora truncate distally, the truncations sulcate . . . . . 4
- Integument of scutellum ferruginous, hind femora without sulcate truncations distally . . . . . 2
- 2. Genae without a distinct process beneath, only slightly angulate midway between base of mandibles and postero-lateral angles of head . . . . . *scutellaris* n. sp.
- Genae with a distinct process beneath . . . . . 3
- 3. Propodeum clothed more or less with dense, appressed, pale pubescence . . . . . *mystici* (Gerst.)
- Propodeum very sparsely clothed throughout with erect, pale hairs .  
*erythraspis* (Gerst.)
- 4. Genal process short, shorter than the second flagellar segment . . . 5
- Genal process long, distinctly longer than the second flagellar segment . . . . . 8
- 5. Front clothed with dense, appressed pale pubescence . . . . . 6
- Front clothed with sparse, inconspicuous, pale pubescence, or almost entirely black pubescent . . . . . 7
- 6. Distance between posterior margin of eyes and postero-lateral angles of head one and one-fourth times the greatest diameter of the eyes . . . . . *maculipennis* (Smith)
- Distance between posterior margin of eyes and postero-lateral angles of head equal to the greatest diameter of eyes . . . *albifrons* n. sp.
- 7. Postgenal area buccate, forming a short ridge extending laterad from each hypostomal process, the ridge almost as high as the process; front and genae with sparse, inconspicuous, pale pubescence . . .  
*buccata* n. sp.

- Postgenal area not buccate, no such ridge present; front, vertex and genae almost entirely fuscous to black pubescent . . . *illex* n. sp.
- 8. Vertex entirely black pubescent . . . . . 9
- Vertex clothed with pale pubescence . . . . . 12
- 9. Posterior marginal fringe of second tergite entirely black . . . 11
- Posterior marginal fringe of second tergite pale, but interrupted medially with black . . . . . 10
- 10. Antennal tubercles slightly elevated, rounded, not dentate; hypostomal process terminating in a very short, inconspicuous tooth . . . . .  
*dentigula* n. sp.
- Antennal tubercles strongly elevated, distinctly dentate; hypostomal process terminating in a slender spine equal to half the length of the transverse proximal part of process . . . . . *protracta* n. sp.
- 11. Third tergite with a pair of lateral, transverse, subtriangular spots of dense, appressed, pale pubescence . . . . . *decumata* n. sp.
- Third tergite entirely black pubescent, except a few pale hairs at the lateral margins . . . . . *nigricans* n. sp.
- 12. Posterior marginal fringe of second tergite entirely black . . . . .  
*cayennensis* Mickel
- Posterior marginal fringe of second tergite pale, except interrupted medially with black hairs . . . . . 13
- 13. Hypostomal processes very slender, spiniform . . . . . *spinigula* n. sp.
- Hypostomal processes longitudinally compressed, triangular . . . . .  
*ferocula* n. sp.

### Group *cephalotes*

**Females.** — Intermediate and posterior femora without sulcate truncations at the tip; postero-lateral angles of head rounded to very slightly angulate, never conspicuously angulate or dentate, sides of propodeum obliquely rugoso-punctate.

**Males.** — Intermediate and hind femora without sulcate truncations at the tip; integument of body black, except the scutellum and metanotum bright ferruginous.

The group *cephalotes* is much more limited in its geographical distribution than the group *armata*. The species are found from Pernambuco southward in the coastal provinces to Rio Grande do Sul, with a westward extension of a few species into northern Argentine Republic, Paraguay and Chapada in Matto Grosso. No records are known from Bolivia.

### *Hoplocrates cephalotes* (Swederus)

- 1787. *Mutilla cephalotes* Swederus, Votensk. Acad. nya Handl., vol. 8, p. 284, female.
- 1790. *Mutilla cephalotes* Gmelin, Linné: Syst. Nat., Ed. 13, vol. 1, pt. 5, p. 2808, female.
- 1821. *Mutilla cephalotes* Klug, N. Acta Acad. Nat. Curios., vol. 10, p. 306, T. 23, f. 11, female.
- 1837. *Mutilla cephalotes* Lucas, Guérin: Dictionn. pittor. d'hist. natur., vol. 5, pt. 2, p. 535, female.

1845. *Mutilla cephalotes* Lapeletier, Hist. nat. Insect., Hymén., vol. 3, p. 611, female.  
 1854. *Mutilla megacephala* Burmeister Abh. naturf. Ges. Halle, Sitzber., vol. 2, female (nec male).  
 1874. *Mutilla cephalotes* Gerstaecker, Arch. Naturg., vol. 40, p. 46, female.  
 1875. *Mutilla megacephala* Burmeister, Bol. Acad. nac. Ci. exact. Univ. Cordova, vol. 1, p. 480, female (nec male).  
 1897. *Mutilla cephalotes* Dalla Torre, Cat. Hymén., vol. 8, p. 22, female (in part).  
 1902. *Mutilla cephalotes* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 25, female.  
 1903. *Hopломutilla cephalotes* André, Gen. Ins., fasc. 11, p. 47, female.  
 1904. *Hopломutilla cephalotes* Ashmead, Can. Ent., vol. 36, p. 7, female.  
 1906. *Mutilla* „*egalicephala* Schulz, Spolia Hymén., p. 158, female.  
 1910. *Hopломutilla cephalotes* Zavattari, Ann. Mus. Zool. Univ. Napoli, vol. 3, n. 9, p. 13, female.  
 1928. *Mutilla cephalotes* Mickel, Bull. 143, U. S. Nat. Mus., p. 32, female.  
 1957. *Hoplocrates cephalotes* Mickel, Rev. Ent. Rio, vol. 7, p. 198 female.

Type. — The type specimen was originally in the Drury collection and is now probably lost. The type locality is given in the original description as «Georgia Americae». This is evidently an error and should be so regarded. The species is easily identified from the original description and there can be no doubt its being this Brazilian species. The type of *megacephala* is in the University of Halle, Germany.

Specimens examined: BRAZIL: female, Cachumbo (Ch. Pujol. 1890) [M. N. H. N.]; female, Barreira, February, 1914 (Bresslau) [Z. M. U.]; 2 females, Bahia (Fruhstorfer) [Z. M. U.]; female, Bahia [Z. M.]; 2 females, Tejuco, January, 1857 (H. Clark) [B. M., U. M.]; 4 females, Mar de Hespanha, November 30, 1904, December 1, 1906, February 28, 1904 [D. E. I.]; female, Minas Geraes [S. C.]; female, Constança, January, 1857 (H. Clark) [B. M.]; female, Porto Cachoeira, Espírito Santo, November 28, 1898 (F. Ohaus) [Z. M.]; female, Espírito Santo, October, 1920 — February, 1921 [D. E. I.]; female, Theresopolis, January 30, 1907 (F. Ohaus) [Z. M. H.]; female, Sumidouro [F. O. C.]; female, Prov. Rio de Janeiro, border of Minas Geraes, November 1, 1894 (Fr. Wiengreen) [Z. M. H.]; female, Rio de Janeiro, January-May, 1920 (E. G. Holt) [C. U.]; female, Val du Rio Pardo, São Paulo [M. N. H. N.]; 3 females, Alto de Serra (Serra bei Santos), January, 1925, April 28, May, 1912 [M. P., U. M.]; female, Ypiranga, São Paulo, February, 1910 (Luederwaldt) [M. P.]; female, Ypiranga, May 1928 (Thomas) [U. M.]; female, Belem, São Paulo, January, 1898 [M. P.]; female, S. Bernardo, S. Paulo (R. Spitz) [M. P.]; female, Juquiá, São Paulo, October, 1920 [U. M.]; female, Anhaugahy, São Paulo, November, 1926 (R. Spitz) [M. P.]; female, Jundiáhy (Schrottky) [M. C. S. N.]; 3 females, Cotia, São Paulo (Gericke) [D. E. I., U. M.]; female, Butantan, São Paulo, February 5, 1922 [D. E. I.]; female, Agua Quente, São Paulo, November 28, 1928 [C. M.]; 4 females, Pinheiros, São Paulo, January 3, 1925, January 5, 1927, April 11, 1927, November 28, 1926 (C. R. Fischer) [M. P., U. M.]; female, São Paulo city (R. Spitz) [N. S.]; female, São Paulo, January 14, 1921 [D. E. I.]; female, São Paulo state, 1905 (P. Friederich) [M. P.]; 4 females, São Paulo state (Hammar) [C. U., U. M.]; female, Sumare, February 19, 1918 [D. E. I.]; female, Boiteuxburgo, Santa Catarina [Z. M. H.]; 16 females [B. M., A. E. S., Z. M., S. C., M. C. S. N.,

U. S. N. M., P. M.]; 15 females, without any locality data [A. E. S., S. C., M. P., I. B., Z. M., M. C. S. N., C. U., I. A. S. P.]

*Cephalotes* is easily recognized by the black pubescent head and prothorax with the remainder of the thorax clothed with dense, appressed, pale golden pubescence, except a median, longitudinal, black pubescent stripe on the dorsum which varies in width from very narrow to broad and conspicuous, and the large, subcircular, bright golden pubescent spot on the second abdominal tergite. Besides the variation in width of the median, black pubescent stripe on the dorsum of the thorax, the color of the posterior marginal fringe of the second tergite varies in color; most of the northern specimens have the fringe pale, interrupted medially with black, while the majority of the specimens have the fringe entirely black. *Mystica* Gerstaecker is probably the male of *cephalotes*.

*Hoplocrates mystica* (Gerstaecker) (n. comb.)

1874. *Mutilla mystica* Gerstaecker, Arch. Naturg., vol. 40, p. 48, male.  
 1897. *Mutilla mystica* Dalla Torre, Cat. Hymen., vol. 8, p. 65, male.  
 1902. *Mutilla mystica* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 67, male.  
 1905. *Hoplomutilla mystica* André, Gen. Insc. fasc. 11, p. 47, male.

Lectotype. — Male, no. 6715, Brazil (Winth.), in Zoologisches Museum der Universität, Berlin.

Specimens examined — Brazil; 2 males, Rio de Janeiro, November (Cresson specimens) [C. M., A. E. S.]; 4 males, Sta. Theresa-Gebirge, Rio de Janeiro, December 26, 1928, January 7, 1929 (O. Conde) [U. M.]; 2 males, Alto da Serra (Serra bei Santos), São Paulo, January, 1926, March 25 (R. Spitz) [M. P., U. M.]; male, Marianna, Minas Geraes, March 19 (Fonseca) [M. P.]; male, without locality data [I. A. S. P.].

The type material (two males) has been studied and one male designated as the lectotype. *Erythraspis* Gerstaecker has been suggested as the male of *cephalotes* Swed. but I believe *mystica* is more likely the opposite sex since the propodeum and sides of thorax are clothed with dense, appressed, pale golden pubescence as in *cephalotes*. *Erythraspis* has the thorax mostly black pubescent, the propodeum with only sparse, erect, pale hairs. This latter species also occurs as far south as Rio Grande do Sul and no specimens of *cephalotes* are known from that province of Brazil. *Mystica* is easily recognized by its velvety black color, maculated with a ferruginous scutellum, the large genal tooth, and the dense, appressed, pale golden pubescence of the sides of thorax and propodeum

entirely, the first abdominal tergite, and the antero-lateral angles of the second tergite.

*Hoplocrates maculiceps*, n. sp.

Female. -- Head black and clothed with black pubescence, except beneath, the clypeus, scape, genae and lateral areas of vertex adjacent to the genae clothed with sparse, appressed and erect, very pale golden pubescence; front and vertex with dense, coarse punctures; genae with distinct, coarse punctures; head beneath with shallow, indistinct punctures; hypostoma elevated posteriorly into a pair of short, blunt teeth; posterior margin of genae produced medially into a large triangular tooth; mandibles edentate at the tip, with a small tooth within near the tip, and with a distinct, triangular tooth within near the base; median area of clypeus vertical (at right angles to mandibles), glabrous, faintly bituberculate medially at the anterior margin, and the anterior margin produced laterally into a short, blunt tooth; antennal tubercles elevated and dentate; vertex with a lateral, broad, shallow groove extending posteriorly from the posterior margin of the eyes.

Thorax black, clothed with black pubescence, except the mesonotum, dorsum and posterior face of propodeum with a pair of broad, lateral stripes of dense, appressed and scattered, erect, pale pubescence, and the mesopleura, metapleura, and sides of propodeum clothed with dense, appressed and scattered, erect, pale pubescence; pronotum, mesonotum and dorsum of propodeum densely, coarsely, longitudinally rugoso-punctate; propleura mostly glabrous, somewhat obliquely striate above.

Abdomen black, clothed with black pubescence, except the lateral areas of first tergite with sparse, erect, pale hairs, the remainder of the first tergite with dense, appressed, pale pubescence, antero-lateral areas of second tergite with sparse, long, semi-erect hairs, the posterior marginal fringe of second tergite pale, broadly interrupted medially with black and the pale hairs not reaching the lateral margins of the tergite, a large, subcircular, median spot of dense, appressed, golden pubescence on the second tergite, the anterior margin of the spot somewhat produced to reach the anterior margin of the tergite, tergites three to five clothed with appressed and erect, pale pubescence broadly interrupted medially with black, and



venter entirely clothed with sparse, pale pubescence; second tergite with moderate, dense punctures throughout except the narrow antero-lateral areas glabrous, almost impunctate; tergites three to five with small close punctures; second sternite with shallow, separated punctures.

Legs entirely black, clothed throughout with sparse, pale pubescence; hind femora not truncate and sulcate distally; calcaria dark brown.

Holotype. — Female, Serra de Comminaty, Pernambuco, Brazil, December 3, 1893 (Gounelle), in Cornell University, Ithaca, N. Y.

Closely related to *cephalotes* Swederus but differs in having the genae and lateral areas of vertex clothed with pale pubescence. The genal and hypostomal processes are similar to those of *cephalotes*.

*Hoplocrates bellica*, n. sp.

Female. — Head black, clothed with black pubescence, head beneath with sparse, pale pubescence, scape with sparse, pale pubescence, genae with very sparse, appressed, pale pubescence, and the vertex with a pair of elongate, cuneiform spots of pale pubescence extending from the posterior margin of the eyes to the posterior margin of the head, the point of the spots at the posterior margin of the eyes; hypostoma produced posteriorly into a pair of conspicuous, blunt teeth, but shorter than the genal teeth, the latter longer, median, triangular, slightly recurved forward at the tip; front and vertex with dense, close punctures, the vertex also with a distinct, median, longitudinal carina; genae with coarse, close punctures; head beneath with sparse, moderate punctures; mandibles edentate at the tip, angulate within near the tip, and with a triangular tooth within near the base; median area of clypeus vertical, (at right angles to mandibles), the anterior margin very weakly bituberculate medially, and bidentate laterally; antennal tubercles elevated, dentate.

Thorax black, clothed with black pubescence, except the mesonotum, dorsum and posterior face of propodeum with a pair of narrow, lateral stripes of thick, appressed, pale pubescence, and the ventral half of mesopleura and metapleura with dense, appressed, pale pubescence; pronotum, mesonotum and dorsum of propodeum coarsely, longitudinally rugosopunctate; propleura almost impunctate, with a few large punctures dorsally; sides of propodeum obliquely rugose.

Abdomen black, clothed with black pubescence, except lateral areas of first tergite with sparse, erect, pale hairs, the large median area with dense, appressed, pale pubescence, interrupted medially with a narrow stripe of black pubescence, broad lateral margins of second tergite pale pubescent, posterior marginal fringe of second tergite pale, being broadly interrupted medially with black and not extending to the lateral margins of the tergite, second tergite with a small, circular, median spot of dense, appressed, golden pubescence about equidistant from the anterior and posterior margins, tergites three to five clothed with pale pubescence broadly interrupted medially with black, and the venter entirely with sparse, pale pubescence; second tergite with moderate to small, dense punctures, except the antero-lateral angles glabrous, almost impunctate; tergites three to five with small, close punctures; pygidial area large, defined laterally, weakly rugoso-granulate; second sternite with shallow, separated punctures.

Legs black, clothed with sparse, pale pubescence, except the middle and hind tibiae dorsally with sparse, black hairs; hind femora not truncate and sulcate distally; calcaria dark brown to black.

Holotype. — Female, Serra Cabral, Minas Geraes, Brazil, 1912 (E. Garbe), in collection of University of Minnesota.

Related to *smithii* Cresson, but the median, golden pubescent spot of the second tergite is much smaller, not extending to the anterior margin as in *smithii*, about equidistant from the anterior and posterior margins, the pale pubescent markings on the vertex are elongate, cuneiform spots instead of narrow stripes, and tergites three to five each have a broad band of pale pubescence broadly interrupted medially with black, instead of a pair of quadrate spots of pale pubescence.

*Hoplocrates smithii* (Cresson) (n. comb.)

1902. *Mutilla Smithii* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 27, female.  
1903. *Hoplomutilla Smithii* André, Gen. In., fasc. 11, p. 47, female.

Type. — Female, Chapada, Matto Grosso, Brazil, in Carnegie Museum, Pittsburgh, Pa.

Specimens examined: BRAZIL; 4 females, Chapada, Matto Grosso, March, October, September (Cresson material) [A. E. S.]; 2 females, Chapada, Matto Grosso, January, July [C. M., U. M.]; female, Goyaz [M. N. H. N.]; female, Ypiranga, São Paulo, November, 1906 (H. Luederwaldt) [M. P.]; female, locality data not legible [N. S.].

Easily recognized by the narrow pale pubescent stripes of the vertex and thorax, the pyriform, golden pubescent spot of the second tergite extending to the anterior margin, the paired, quadrate, pale pubescent spots on tergites three to five, and the obliquely rugose sides of propodeum. The hind femora are not truncate and sulcate at the tip, and the species is therefore a member of the *cephalotes* group and not closely related to *armata centromaculata* and *spiniceps* as suggested by Cresson.

*Hoplocrates miles* (Burmeister)

1854. *Mutilla miles* Burmeister, Abh. naturf. Ges. Halle, Sitzber., vol. 2, p. 25, female.  
 1874. *Mutilla miles* Gerstaecker, Arch. Naturg., vol. 40, p. 47, female (in part).  
 1875. *Mutilla miles* Burmeister, Bol. Acad. nac. Ci. exact., Univ. Cordova, vol. 1, p. 480, female.  
 1897. *Mutilla miles* Dalla Torre, Cat. Hymen., vol. 8, p. 62, female.  
 1903. *Hoplonutilla* André, Gen. Ins., fasc. 11, p. 47, female.  
 1937. *Hoplocrates miles* Mickel, Rev. Ent. Rio. vol. 7, p. 198, female (in part, Spinola spec. n. 53.2.).

Type. — Female, Lagoa Santa, Brazil, in University of Halle, Germany.

Specimens examined. — Brazil ; female, Pouso Alegre, Minas Geraes 1905 (A. Pimentel [M. P.]; female, Sete Lagoas, Minas Geraes (Reinhardt) [Z. M.]; 4 females, Minas Geraes (Reinhardt) [Z. M., U. M.]; female, Minas Geraes [M. N. H. N.]; female, Brazil [B. M.]; 2 females, without locality data [S. C., M. N. H. N.].

Related to *cephalotes*, but differs in having the sides of the propodeum sparsely pubescent, the vertex with a pair of elongate, subtriangular pale pubescent spots, and the median pubescent spot of second abdominal tergite scarlet.

*Hoplocrates miles atriceps*, n. var.

1874. *Mutilla miles* Gerstaecker, Arch. Naturg., vol. 40, p. 47, female (in part).  
 1937. *Hoplocrates miles* Mickel, Rev. Ent. Rio., vol. 7, p. 198, female (in part, Spinola, specimen 53.3).

Female. — Exactly like *miles*, but the head is entirely black pubescent, without pale pubescent maculations on the vertex; the longitudinal, lateral, pale pubescent stripes on the dorsum of thorax are greatly abbreviated, being absent on the mesonotum and present only on the propodeum. Length, 18 mm.

Holotype. — Female, Barbacena, Minas Geraes, Brazil, December 18, 1905 (Ducke), in Muséum Nationale d'Histoire Naturelle, Paris.

Paratypes. — Female, Lagoa Santa, Brazil [Z. M.]; female, Minas Geraes, (Reinhardt) [U. M.]; female, Brazil [U. M.].

Since these specimens with the reduced pale pubescent markings occur in the same localities as *miles* Burmeister, I consider them to be only a variety.

*Hoplocrates specularis* (Gerstaecker) (n. comb.)

1854. *Mutilla cephalotes* Burmeister, Abh. naturf. Ges. Halle, SitzBer., vol. 2, p. 25, female (nec Swederus).  
 1874. *Mutilla specularis* Gerstaecker, Arch. Naturg., vol. 40, p. 47, female.  
 1875. *Mutilla cephalotes* Burmeister, Bol. Acad. nac. Ci. exact. Univ. Cordova, vol. 1, p. 480, female.  
 1897. *Mutilla specularis* Dalla Torre, Cat. Hymen., vol. 8, p. 87, female.  
 1902. *Mutilla (Hoplomutilla) specularis* Mantoro, Bol. Soc. ent. Ital., vol. 34, p. 124, female.  
 1903. *Hoplomutilla specularis* André, Gen. Ins., fasc. 11, p. 47, female.

*Specularis* is the name proposed by Gerstaecker for *cephalotes* Burmeister (nec Swederus). Gerstaecker drew his descriptions from specimens collected at Salto Grande, Nova Friburgo, Brazil. One of these has been designated as lectotype.

Lectotype. — Female, Salto Grande, Brazil, in Zoologisches Museum der Universität, Berlin.

Paratypes. Two females, Salto Grande, Brazil, in Zoologisches Museum der Universität; two females, Nova Friburgo, Brazil, in University of Halle, Germany.

Specimens examined. — 2 females, Boundary between Rio de Janeiro and Minas Geraes, Brazil, November 1, 1894 (Fr. Wiengreen) [Z. M. H., U. M.]; female, Paulo Frontin, Paraná, Brazil, January 20, 1920 [D. E. I.]; female, Jaraguá, Brazil [M. N. H. N.]; female, Joinville, Sta. Catharina, Brazil (Schmalz) [Z. M. U.]; female, Brazil, locality illegible [Z. M. U.]; Brazil [Z. M.]; female, Rio Monday, Paraguay, December, 1898 (G. Boggiani; Mantoro specimen) [M. C. S. N.]; female, Paraguay (Schrottky) [C. U.]; 2 females, Surinam (locality label probably incorrect) [Z. M.]; female, without locality data [M. N. H. N.].

Typical specimens of *specularis* have the vertex entirely black pubescent, without any indication of a pair of pale pubescent spots. This species differs from all the foregoing in having the dorsum of the thorax maculated with two pair of large pale pubescent spots, one pair on the mesonotum and one pair on the dorsum of propodeum. The color of the median pubescent spot on the second abdominal tergite is fulvo-ferruginous. The specimens vary in length from 12 mm. to 20 mm.

*Hoplocrates specularis subtilis*, n. var.

1902. *Mutilla specularis* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 25, female (nec Gerstaecker).

Female. — Exactly like *specularis* Gerstaecker, except the vertex not entirely black pubescent, but with a pair of spots of thin, appressed pale pubescence. Length, 15 mm.

Holotype. — Female, Theresopolis, Santa Catharina, Brazil (S. Michaelis), in Zoologisches Museum der Universität, Berlin.

Paratypes. — Female, Taquara do mundo novo [M. N. H. N.]; 2 females, Jundiahy, Brazil, 1898 [M. N. H. N.]; female, Hansa Humboldt, Santa Catharina, February, 1932 [D. E. I.]; 3 females, Theresopolis, Santa Catharina, Brazil [Z. M. U., U. M.]; female, Boiteuxburgo, Santa Catharina, Brazil, February; 1930 [Z. M. H.]; female, Rio Laciass, Santa Catharina, Brazil, January 18, 1931 [D. E. I.]; 2 females, Santa Catharina, Brazil [C. U., M. C. S. N.]; 3 females, Santa Cruz, Rio Grande do Sul, Brazil, July 10, 1895 (Fr. Stieglmayr) [Z. M. H., U. M.]; 2 females, Rio do Sul, Brazil [A. E. S., M. N. H. N.]; female, Süd Brasil, August 27, 1920 (W. Kramerder) [Z. M. H.]; 2 females, Brazil [B. M., D. E. I.]; 2 females, Tyu-Cuare près San Ignacio, Haut Paraná, Argentine Republic, March-April [M. N. H. N., U. M.]; female, Paraguay (Schrottky) [C. U.].

This variety occurs over the same geographical range as the typical form with the black vertex. The male of *specularis* and its variety may be *erythraspis* Gerstaecker which has a similar geographical distribution. The paratypes vary in length from 12 mm. to 19 mm.

*Hoplocrates erythraspis* (Gerstaecker) (n. comb.)

1854. *Mutilla megacephala* Burmeister, Abh. naturf. Ges. Halle, SitzBer., vol. 2, pp. 25-26, male (nec female).  
 1874. *Mutilla erythraspis* Gerstaecker, Arch. Naturg., vol. 40, p. 48, male.  
 1875. *Mutilla erythraspis* Burmeister, Bol. Acad. nac. Ci. exact, Univ. Cordova, vol. 1, p. 481, male.  
 1879. *Mutilla rufoscutellata* Smith, Deser. N. Spec. Hymen., p. 216, male. (New synonymy).  
 1897. *Mutilla erythraspis* Dalla Torre, Cat. Hymen., vol. 8, p. 35, male (in part).  
 1897. *Mutilla rufoscutellata* Dalla Torre, Cat. Hymen., vol. 8, p. 82, male.  
 1903. *Hoplomutilla erythraspis* André, Gen. Ins., fasc. 11, p. 47, male.  
 1903. *Hoplomutilla rufoscutellata* André, Gen. Ins., fasc. 11, p. 74, male.

Gerstaecker's type material included four males from Salto Grande, Brazil and two males from Nova Friburgo, Brazil. One of these has been designated as lectotype. The type of *rufoscutellata*, from Parana, Brazil, is in the British Museum (Natural History), London.

Lectotype. — Male, Salto Grande, Brazil, in Zoologisches Museum der Universität, Berlin.

**Paratypes.** — Three males, Salto Grande, Brazil, in Zoologisches Museum der Universität, Berlin; two males, Nova Friburgo, Brazil, in University of Halle, Germany.

**Specimens examined.** — 2 males, Santa Cruz, Rio Grande do Sul, Brazil, July 10, 1895 (Fr. Stieglmayr [Z. M. H., U. M.]; 2 males, Rio Grande do Sul (Stieglmayr) [N. S.]; male, Brazil, locality illegible [Z. M. N.]; 2 males, Brazil [S. C., U. M.]; male, locality label illegible [S. C.].

Very similar in appearance to *mystica* Gerstaecker, but is blacker on account of the paucity of pale pubescence on the thorax. This is probably the male of *specularis* Gerstaecker as it has practically the same southern distribution as that species. Specimens compared with Smith's type of *rufoscutellata* were compared with the lectotype selected from Gerstaecker's type material.

*Hoplocrates scutellaris*, n. sp.

1937. *Hoplocrates* sp. Mickel, Rev. Ent. Rio., vol. 7, p. 200, male.

**Male.** — Head entirely black, clothed with sparse, black pubescence, except beneath and the scape with sparse pale pubescence; mandibles edentate at the tip and with two distinct teeth within somewhat remote from the tip; antennal tubercles slightly elevated, the carina defining the antennal scrobes above terminating on them; front, vertex and genae with moderately small, dense punctures; ocelli very small; posterior margin of genae not produced into a distinct process, but distinctly angulate medially; hypostoma produced posteriorly into a pair of small teeth; postero-lateral angles of head obtusely angulate, but not dentate.

Thorax entirely black, except the integument of scutellum and metanotum ferruginous, clothed with sparse, black pubescence, except the scutellum with very sparse, erect dark hairs, the metanotum, the propodeum entirely and the pleural areas with sparse, pale pubescence; pronotum and mesonotum with moderate, dense punctures; parapsidal furrows weak and inconspicuous; scutellum with large, close punctures; dorsum and posterior face of propodeum with large, distinct, close punctures, almost finely, deeply reticulate; propleura weakly striato-punctate; mesopleura divided into ventral and dorsal convex areas by a longitudinal furrow, both areas with moderate, dense punctures; metapleura transversely rugose,

except the anterior half of the ventral two-thirds, glabrous, unsculptured.

Abdomen entirely black and clothed with sparse, black pubescence, except the first tergite with sparse, erect, pale pubescence, and a thick, posterior marginal fringe of appressed, pale pubescence, very broad, lateral, marginal areas of second tergite with sparse, pale pubescence, the posterior marginal fringe of second tergite pale, interrupted medially with black, the third tergite clothed with erect and appressed, pale pubescence interrupted medially with black, and all the sternites clothed with very sparse, pale hairs; first tergite with small, very close punctures; second tergite with moderately small punctures, distinct and separate at the anterior middle, close posteriorly and at the sides; tergites three to six with small, close punctures; second sternite with moderately small, well separated punctures; sternites three to six with small, close punctures.

Legs entirely black, clothed with sparse, pale pubescence; calcaria black. — Length, 11 mm.

Holotype. — Male, Joinville, Santa Catharina, Brazil, 1904 (von Rolle), in collection of University of Minnesota.

Paratypes. — Male, Joinville, Santa Catharina, Brazil, 1904 (von Rolle) [M. P.]; 2 males, Blumenau, Santa Catharina, Brazil, January, 1885 (Hetschko) [N. S., U. M.]; male, Blumenau, Santa Catharina, Brazil, 1897 (Virgil) [M. N. H. N.]; male, Santa Catharina (E. A. Boetcher) [Z. M. U.]; male, Santa Catharina [M. N. H. N.]; 2 males, Colon. Hansa, Brazil (5903) [C. U.]; male, Bocaina, São Paulo, Brazil, April 24 [M. P.]; male, Brazil [Z. M.].

*Scutellaris* is a manuscript name attributed to Klug by Spinola for this species, and it is herewith adopted. The species is easily recognized by its almost entirely black color relieved only by the ferruginous scutellum and metanotum, the angulate genae, the entirely fuliginous wings, and its small size. The paratypes vary in length from 9 to 13 mm. Four of the paratypes have the posterior marginal fringe of the second tergite entirely black but otherwise are exactly the same as the type. Specimens with the pale marginal fringe, and with a black marginal fringe come from the same locality. Spinola specimen n.º 159 has the posterior marginal fringe of the second tergite black.

#### *Group armata*

Females. — Intermediate and posterior femora truncate at the tip, the faces of the truncations sulcate; postero-lateral

angles of head produced and prominent, either strongly angulate or dentate; hypostomal process well developed, either longer or shorter than the genal process; sides of propodeum weakly sculptured, usually only punctate posteriorly but sometimes rugoso-punctate on the ventral two-thirds.

Males. --- Intermediate and posterior femora truncate at the tip, the faces of the truncations sulcate; integument entirely black, the scutellum and metanotum never ferruginous.

The group *armata* is widely distributed over South America, with numerous species limited in distribution.

*Hoplocrates gratiosa*, n. sp.

1902. *Mutilla moneta* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 27, female.

1903. *Hopliomutilla moneta* var. *rufonotata* Andre, Z. Hymen. Dipt., vol. 6, p. 33, female.

Female. — Head entirely black, clothed with sparse, black pubescence, except beneath with sparse, erect, pale hairs, the clypeus and antennal scrobes with sparse, erect, pale hairs, the genae entirely and the posterior half of vertex with sparse, more or less appressed pale pubescence; dentition of mandibles within not visible, but edentate at tip; anterior margin of clypeus bidentate medially, slightly elevated along the transverse midline, the elevation weakly bituberculate medially, thus the median area of clypeus with two pair of tubercles, one pair directly behind the other; antennal tubercles only moderately elevated; front and vertex with moderate, dense punctures; genae with moderate, close punctures; postero-lateral angles of head produced and strongly angulate, almost dentate; genal process long and comparatively slender, a strong carina beginning at the tip of the genal process extending down the posterior surface, along the posterior margin of genae and terminating at the postero-lateral angles; broad area dorsad of genal carina glabrous, impunctate; hypostomal processes strong, transversely flattened, distinctly shorter than the genal processes.

Thorax entirely black, clothed with sparse, black pubescence, except the posterior face of propodeum with sparse, erect, pale hairs, and the pleural areas with thick, but not dense, somewhat appressed, pale pubescence; pronotum and mesonotum with moderate, dense punctures; dorsum of propodeum with large, dense punctures; propleura glabrous almost impunctate; mesopleura and metapleura micropunctate,



the mesopleura with a dorso-ventral row of setiferous punctures medially; sides of propodeum glabrous, weakly, obliquely rugose.

Abdomen entirely black, except integument at posterior margin of first tergite, and beneath median pubescent spot of second tergite, fulvous; abdomen clothed with sparse, black pubescence, except the posterior margin of the first tergite, an elongate ovate, median spot on the second tergite extending to the anterior margin, posterior marginal fringe of second tergite interrupted medially with black and not extending to the lateral margins, and third tergite entirely, except at the lateral margins, all with golden appressed pubescence, and broad, lateral margins of second tergite, as well as all the sternites with very sparse, scattered, pale hairs; first tergite with moderately large, dense punctures, except the broad, posterior margin glabrous, impunctate; second tergite with moderate, dense punctures; tergites three to five with moderate, close punctures, second sternite with scattered, moderate punctures; sternites three to five with moderate, close punctures posteriorly.

Legs entirely black, clothed with sparse, pale hairs; calcaria black. — Length, 13 mm.

Holotype. — Female, Bolivia, in Muséum Nationale d'Histoire Naturelle.

Paratypes. — Females, Yungas de Coroico, Bolivia [M. N. H. N.]; five females, Bolivia [M. N. H. N., Z. M. U., M. C. S. N., A. E. S., U. M.].

Related to *moneta* Gerstaecker, but differs in the carinate posterior margin of the genae with its adjacent, glabrous area, the weakly tuberculate median area of clypeus with two pairs of tubercles one behind the other, and the black pubescent dorsum of thorax. This species differs from *rufonotata* André, the type of which has been examined, in being smaller, in the more weakly tuberculate clypeus, the carinate genae and the entirely black pubescent dorsum of thorax.

*Hoplocrates rufonotata* (André) (n. comb.)

1906. *Hoplomutilla moneta* var. *rufonotata* André, Z. Hymen. Dipt., vol. 6, p. 33, female (in part).

1913. *Hoplomutilla moneta* var. *rufonotata* André, Mission Service Geol. l'Armée, vol. 10, pt. 1, p. 2, female (in part).

Type. — Female, Marcapota, Peru, in Hungarian National Museum, Budapest.

Specimens examined. — Female, Callanga Peru [U. M.]; female, Yungas de Coroico, Bolovia [M. N. H. N.]; female, Huagamba? [M. C. S. N.].

*Rufonotata* André differs from the preceding species in that the clypeus is elevated along the transverse midline and strongly bituberculate medially, thus the clypeus has two pair of median tubercles, a weak pair at the anterior margin and a strong pair directly behind them; also differs in lacking a carina at the posterior margin of the genae, and the mesonotum sparsely, pale pubescent medially.

### *Hoplocrates moneta* (Gerstaecker)

1874. *Mutilla moneta* Gerstaecker, Arch. Naturg., vol. 40, pp. 47-48, female.  
 1879. *Mutilla quadridens* Blake, Trans. Amer. ent. Soc., vol. 7, p. 247, female. (New synonymy).  
 1886. *Sphaerophthalma quadridens* Blake, Trans. Amer. ent. Soc., vol. 13, p. 247, 2, p. female.  
 1894. *Sphaerophthalma quadridens* Cameron, Biol. Centr. Amer., Hymen., vol. 2, p. 317, female.  
 1897. *Mutilla moneta* Dalla Torre, Cat. Hymen., vol. 8, p. 63, female.  
 1897. *Mutilla quadridens* Dalla Torre, Cat. Hymen., vol. 7, p. 63, female.  
 1903. *Hoplomutilla moneta* André, Gen. Ins., fasc. 11, p. 47, female.  
 1903. *Ephuta* (*Ephuta*) *quadridens* André, Gen. Ins., fasc. 11, p. 63, female.  
 1937. *Hoplocrates moneta* Mickel, Rev. Ent. Rio., vol. 7, p. 198, female.

Lectotype. — Female, Bogotá, Colombia (Lindig), in Zoologisches Museum der Universität, Berlin.

Paratypes. — Four females, Bogotá, Colombia (Lindig) [Z. M. U.].

The type of *quadridens* Blake (Panama) is in the collection of the American Entomological Society, Philadelphia.

Specimens examined. — Female, Bogotá, Colombia [S. C.]; 6 females, San Antonio, Colombia [M. N. H. N., U. M.]; female, Rio Agneta, Colombia [M. C. S. N.]; female, Rio Agratal, Colombia, June 16, 1908 [M. N. H. N.]; female, Mt. Tolima, Colombia [M. N. H. N.], 6 females, Colombia [M. N. H. N., S. C., Z. M. H., U. S. N. M., U. M.]; female, Guayaquil, Ecuador, November, 1902 (Buchwald) [M. N. H. N.]; 2 females, Chanchamayo, Peru [M. N. H. N., M. C. S. N.]; female, San José [M. Z. A.]; female, locality data illegible [A. M. N. H.].

Easily identified by the form of the clypeus, the transverse, median, elevated line being strongly bidentate medially.

### *Hoplocrates lingulatus*, n. sp.

- ! 1855. *Mutilla armata* Smith, Cat. Hymen. Brit. Mus., vol. 3, p. 41, female (in part, Rio Tapajos specimen only).

Female. — Head entirely black, clothed with black pubescence, except beneath with sparse, erect, pale hairs, the clypeus with sparse, erect pale hairs, the scape and first seg-

ment of flagellum with sparse, pale pubescence, and the genae with scattered, subappressed, pale pubescence; hypostomal processes extremely large, massive, subconical, recurved at the tip, glabrous within, punctate outwardly; genal process small, about one-fourth the length of the hypostomal process; mandibles edentate at the tip and with two strong teeth within somewhat remote from the tip; anterior margin of clypeus distinctly bituberculate medially and with a distinct, conspicuous tooth laterad, the posterior margin produced medially into a spatulate, tongue-like process, the latter slightly recurved dorsally at the tip; antennal tubercles elevated and moderately dentate; front with a median tubercle between the eyes formed by a short, elevated, longitudinal carina; front and vertex with moderate, dense punctures; genae with moderately large, close punctures anteriorly, and scattered, similar punctures ventrally and posteriorly; postero-lateral angles conspicuous, compressed, bluntly dentate; genae without a carina from the genal process to the postero-lateral angles.

Thorax entirely black, clothed with black pubescence, except the pleural areas with pale pubescence, sparse and inconspicuous on the propleura and sides of propodeum, thick and appressed on the mesopleura and metapleura; dorsum of thorax, including dorsum of propodeum with moderately large, dense, deep, somewhat confluent punctures, almost longitudinally rugoso-punctate.

Abdomen black, except the broad, posterior margin of the first tergite, and the integument beneath the median pubescent spot of the second tergite, fulvo-ferruginous; abdomen clothed with black pubescence, except the first tergite with sparse, erect, pale hairs and a posterior marginal fringe of golden pubescence, the second tergite with a very large, subovate spot of fulvous, appressed pubescence extending to the anterior margin of the tergite and almost to the posterior margin, and also the antero-lateral angles with an elongate area of sparse, appressed, pale pubescence, the lateral margins with sparse, erect, pale hairs, and the posterior margin with a fringe of pale hairs interrupted medially with black, the third tergite clothed with dense, appressed, pale pubescence and a posterior marginal fringe of pale pubescence, both broadly interrupted medially with black, fourth and fifth tergites with scattered pale hairs in addition to the black pubescence, the pygidial tergite with pale pubescence anteriorly and

laterally, and all the sternites with scattered, pale pubescence; anterior face of first tergite sparsely punctate, the anterior half of the dorsal face densely punctate and the posterior half glabrous, impunctate; tergites two to five with moderate, dense, confluent punctures; second sternite with moderately large punctures, shallow, sparse, and indistinct medially, distinct and somewhat close laterally and posteriorly; sternites three to five with moderate, dense punctures posteriorly.

Legs entirely black, sparsely clothed with pale hairs; calcaria black. — Length, 21 mm.

Holotype. — Female, Rio Madeira, Brazil (Mann and Baker), Cat. No. 54062, U. S. National Museum, Washington, D. C.

Easily recognized by the tongue-like process of the clypeus, the black pubescent head and thorax and the large, median, fulvous pubescent spot of the second tergite.

*Hoplocrates spiniceps* (Cresson) (n. comb.)

1902. *Mutilla spiniceps* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 26, female.

1903. *Hopломutilla spiniceps* André, Gen. Ins., fasc. 11, p. 47, female.

Type. — Female, Santarem, Brazil, in Carnegie Museum, Pittsburg, Pa.

Specimens examined. — Female, Santarem, Brazil, April, 1919 (S. M. Klages) [C. M.]; 4 females, Santarem, Brazil, June, 1919 (S. M. Klages) [C. M., U. M.]; female, Santarem, Brazil, July, 1919 (S. M. Klages) [U. M.]; female, Tapajos, Brazil [B. M.]

In addition to the large hypostomal processes, the following characters are of importance in identification; anterior margin of clypeus bituberculate medially, but not at all produced posteriorly; front, vertex and dorsum of thorax entirely black pubescent; median pubescent spot of second tergite narrowly ovate varying in color from almost white to deep golden.

*Hoplocrates centromaculata* (Cresson) (n. comb.)

1902. *Mutilla centromaculata* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 27, female.

1903. *Hopломutilla centromaculata* André, Gen. Ins., fasc. 11, p. 47, female.

Type. — Female, Paracary, Para, Brazil, in Carnegie Museum, Pittsburg, Pa.

Specimens examined. — Female, Santarem, Brazil [M. N. H. N.]; 2 females, Obidos, Brazil, 1904 (P. Lecointe) [M. N. H. N., U. M.];

female, Obidos, Brazil (P. Kibler) [Z. M. U.]; female, Les Hattes, Bas Maroni, French Guiana [M. N. H. N.]; female, Cayenne [M. N. H. N.]; female, Georgetown, British Guiana, July, 1921 (A. Busck) [U. S. N. M.]; female, Mt. Duida, Venezuela, November 10, 1924 [A. M. N. H.]; female, San José, Costa Rica, November, 1911 (W. M. Wheeler) (probably incorrect locality) [A. M. N. H.]; female, Cucuhy, Peru [M. N. H. N.].

Characterized by the large, transversely compressed hypostomal processes, subtriangular clypeal process emarginate medially at the tip, and the cupreous pubescent spot of the second tergite. Specimens vary in length from 15 mm. to 19 mm.

*Hoplocrates capitulata*, n. sp.

**Female.** — Head piceous, clothed beneath with sparse, appressed and erect, pale pubescence, the proximal two-thirds of mandibles, clypeus, antennal scrobes, scape and genae, all with sparse, pale pubescence; front and vertex with sparse, black pubescence, except the vertex with a pair of large, triangular spots of thick, appressed, pale pubescence, the spots separated medially by a space equal to the distance between the antennal tubercles, and merging laterally into the sparse, pale pubescence of the genae; mandibles edentate at the tip, with a small tooth within remote from the tip and a large obtuse tooth proximal of the smaller one; median area of clypeus produced beyond and above the anterior margin, the process broad and strongly bituberculate, almost bluntly bidentate; dorsal surface of process weakly, finely punctate; antennal tubercles angulate, but only slightly elevated; scape closely, shallowly punctate; front and vertex with moderately small, dense, deep, distinct punctures; genae with moderate, close punctures, the latter more separated, shallower and larger than on front and vertex; postero-lateral angles with a short, moderate carina, the latter not elevated and terminating abruptly posteriorly, but gradually fading out posteriorly; genal process short, not longer than the second flagellar segment; hypostomal processes long, well developed, twice as long as the genal process, transversely compressed, spatulate and squarely truncate at the tip; distance between the posterior margin of eyes and postero-lateral angles almost but scarcely equal to the greatest diameter of the eyes.

Thorax piceous; pronotal area clothed with sparse, black pubescence intermixed with black, spatulate hairs; mesonotal

area and dorsum of propodeum with a broad, lateral line of sparse, pale golden pubescence, the lines coalescing medially on the dorsum of propodeum to form a U, elsewhere with sparse, black pubescence; posterior face of propodeum and pleural areas entirely with thick, fine, appressed, pale pubescence; dorsum of thorax with moderate, dense, somewhat confluent punctures; posterior face of propodeum, propleura, mesopleura and metapleura, all micropunctate and each with a few, small, scattered punctures; sides of propodeum transversely rugose.

Abdomen dark ferruginous; anterior face of first abdominal tergite with sparse, fine punctures, and sparse, erect, pale hairs; junction of anterior and dorsal faces of first tergite coarsely punctate, subasperate; dorsal surface of first tergite clothed with thick, appressed, pale pubescence, but interrupted medially by a bare area and the pubescence adjacent to the bare area pale golden; second tergite with small, dense, deep, distinct punctures, clothed with sparse, black pubescence intermixed with black, spatulate hairs, except a large, median, ovate spot of dense, appressed, bright coppery pubescence extending from the anterior margin almost to the posterior margin, an elongate spot of sparse, pale pubescence adjacent to the inner margin of the pale felt lines, and the thin, posterior marginal fringe pale, but strongly interrupted medially with black hairs; tergites three to five with very close, small punctures; third tergite clothed with sparse, pale pubescence, a few black hairs medially, and a pair of lateral, transverse lines of thick, pale pubescence at the anterior margin; tergites four, five and the lateral and anterior margins of the pygidial tergite, all with sparse, pale pubescence; first sternite with very sparse, pale pubescence, without a median, longitudinal carina; second sternite with moderate, well separated, distinct punctures, the posterior margin with small, close punctures, and clothed throughout with sparse, erect, pale hairs; sternites three to five with moderate, close punctures and sparse, erect, pale hairs; last sternite closely punctate laterally and with sparse, erect, pale hairs.

Legs dark ferruginous, clothed with sparse, erect, pale hairs; calcaria ferruginous. — Length, 12 mm.

Holotype. — Female, St. Jean du Maroni, French Guiana, April-May, in Muséum Nationale d'Histoire Naturelle, Paris.

Distinctly related to *centromaculata* (Cresson) as indicated by the hypostomal processes and the form of the clypeus which is less strongly produced than in *centromaculata*. Differs in having the head much less well developed behind the eyes as indicated in the key, and in the much less strongly carinate postero-lateral angles. The pubescent markings are approximately the same in both species.

*Hoplocrates elecebra*, n. sp.

Female. — Head entirely black, clothed with black pubescence, except beneath with sparse, erect, pale pubescence, the clypeus and antennal scrobes with thick, erect, pale pubescence, and the vertex with a pair of spots of dense, appressed, pale pubescence; hypostomal processes large, massive, conical, punctate outwardly, much longer than the genal process, the latter small, slightly curved anteriorly, about one-fourth the length of the hypostomal process; mandibles edentate at the tip and with a pair of distinct, strong teeth within somewhat remote from the tip; anterior margin of median area of clypeus elevated medially into a pair of distinct teeth; antennal tubercles elevated but not dentate; scape and first segment of flagellum pale pubescent; front and vertex with moderate, dense punctures; genae with moderate, distinct, close punctures; genae with a carina extending from genal tooth to postero-lateral angles, then turning at a right angle and extending onto vertex; postero-lateral angles prominently angulate but not dentate, compressed.

Thorax entirely black, clothed with black pubescence, except the mesonotum with a transverse, arcuate band of pale golden pubescence, and all the pleural areas and the posterior face of propodeum with appressed, pale pubescence, sparse on the propleura, sides of propodeum, and posterior face of propodeum, thick on the mesopleura and metapleura; dorsum of thorax, including dorsum of propodeum with large, dense, somewhat confluent punctures; propleura, mesopleura and metapleura micropunctate, with a very few, scattered punctures; sides of propodeum rugoso-punctate posteriorly and ventrally.

Abdomen entirely black, clothed with black pubescence, except first tergite with very sparse pale pubescence, and a broad, posterior marginal band of dense, appressed pubescence narrowly interrupted medially, the second tergite with the lateral margins sparsely pale pubescent, with a posterior marginal fringe of pale pubescence interrupted medially with black,

and an elongate ovate spot of deep golden pubescence, the spot extending to the anterior margin, the third tergite clothed with dense, appressed, pale pubescence broadly interrupted medially with black, and a posterior marginal fringe of pale pubescence similarly interrupted, third and fourth tergites with a few pale hairs at the lateral margins, and all the sternites clothed with sparse, pale pubescence; anterior face of first tergite with sparse, small punctures; anterior half of dorsal face of first tergite coarsely, deeply punctate, somewhat asperate, the posterior half glabrous, impunctate; second sternite coarsely, densely punctate, the lateral thirds of the disk asperate; tergites three to five with moderate, dense punctures, second sternite with moderate, distinct, close punctures laterally, the punctures smaller, shallower and sparser medially; sternites three to five with moderate, dense punctures posteriorly.

Legs entirely black, clothed with sparse, pale pubescence; calcaria ferruginous. — Length, 16 mm.

Holotype. — Female, Cayenne, in Muséum Nationale d'Histoire Naturelle, Paris.

Differs from the preceding in the widely separated, divergent, elongate conical, hypostomal processes, the marginal teeth on the clypeus recurved upward, the carina extending from the genal process to the postero-lateral angles, and the asperate lateral areas of second tergite.

*Hoplocrates dryope*, n. sp.

Female. — Head entirely black, clothed with black pubescence, except beneath with sparse, erect, pale hairs, the genae with sparse, subappressed, pale pubescence, the clypeus and antennal scrobes with sparse, erect, pale pubescence, and the vertex with a pair of spots of dense, appressed, pale pubescence; hypostomal processes large, massive, subconical, punctate outwardly, and very slightly recurved at the tip; genal process small, about one-fourth the length of the hypostomal process; mandibles edentate at the tip and with two distinct teeth within somewhat remote from the tip; median area of clypeus produced anteriorly into a short, broad process, bituberculate at its anterior margin, scape clothed with sparse, pale pubescence; antennal tubercles subdentate; front and vertex with moderate, dense, confluent punctures; genae with moderate distinct punctures and without a carina extending



from the genal tooth to the postero-lateral angles, the latter rectangulate, but not conspicuously dentate.

Thorax entirely black, clothed with black pubescence, except the mesonotum with a pair of inconspicuous, lateral spots of sparse, golden pubescence, and the pleural areas and posterior face of propodeum with appressed, pale pubescence and sparse, erect, pale hairs, the pubescence thinner on the propleura and sides of propodeum than elsewhere; anterior spiracular tubercles dentate; dorsum of thorax, including dorsum of propodeum with large, dense, confluent punctures; propleura, mesopleura and metapleura micropunctate and with a few, scattered, small punctures; sides of propodeum rugoso-punctate posteriorly and ventrally.

Abdomen black, except the dorsal face of first tergite, and posterior margins of tergites two to five ferruginous; abdomen clothed with black pubescence, except the anterior face of first tergite clothed with sparse, erect, pale hairs, the dorsal face with a few, scattered, appressed, golden hairs in addition to the erect, black hairs at the anterior margin, the second tergite with broad, lateral margins sparsely, pale pubescent, the antero-lateral angles with elongate spots of sparse, subappressed, pale hairs, the posterior marginal fringe pale interrupted medially with black, and a median, elongate ovate spot of dense, appressed, golden pubescence extending to the anterior margin, the third tergite with lateral, transverse spots of dense, appressed, pale pubescence, and a posterior marginal fringe of golden pubescence interrupted medially with black, the fourth and fifth tergites each with an inconspicuous marginal fringe of golden pubescence interrupted medially with black and with erect, pale hairs at the lateral margins, and all the sternites with sparse, pale pubescence; anterior face of first tergite with sparse, fine punctures; junction of anterior and dorsal faces of first tergite coarsely, densely punctate, subasperate, the dorsal face glabrous, impunctate; second tergite with moderately coarse, dense confluent punctures, the latter coarser and subasperate laterally; tergites three to five with moderate, dense, confluent punctures; second sternite with moderate punctures, separate and distinct on the disk, becoming closer laterally, and dense and confluent at the posterior margin; sternites three to five with moderately large, dense, confluent punctures posteriorly.

Legs black, clothed with sparse, pale pubescence; calcaria ferruginous. — Length, 16 mm.

Holotype. — Female, Itaituba, Minas Geraes, Brazil, in Muséum Nationale d'Histoire Naturelle, Paris.

Closely related to *elecebra*, but lacks the genal carina, has the clypeus bituberculate instead of bidentate, the antennal tubercles are dentate, the pubescence of the dorsal face of first tergite is sparse and golden, and the median, golden pubescent spot of the second tergite is distinctly broader.

*Hoplocrates amoena*, n. sp.

Female. — Head entirely black, clothed with black pubescence, except the head beneath with sparse, erect, pale hairs, clypeus and antennal scrobes with sparse, erect, pale hairs, scape and first segment of flagellum with sparse, pale pubescence, vertex with a pair of spots of dense, appressed, pale pubescence, and genae with sparse, subappressed, pale pubescence; hypostomal processes large, massive, subconical, slightly recurved outwardly at the tip, punctate outwardly; genal process small, about one-third the length of hypostomal process; mandibles edentate at the tip and with two distinct teeth within somewhat remote from the tip; median area of clypeus produced anteriorly just anterior to the transverse midline, the process forming two small teeth, the anterior margin of the clypeus ventrad of the process bituberculate medially; antennal tubercles elevated and subdentate; front and vertex, with moderate, dense, confluent punctures; genae with moderately large, close, distinct punctures; postero-lateral angles compressed, bluntly dentate; genae without a carina between the genal tooth and postero-lateral angles.

Thorax black, except the mesonotum ferruginous, the ferruginous area angulately extended onto the middle of the dorsum of propodeum, the angulation extending to the posterior margin of dorsum of propodeum; thorax clothed with sparse, black pubescence, except the pleural areas and posterior face of propodeum with appressed and erect, pale pubescence, the appressed pubescence thin on the propleura, sides of propodeum and posterior face of propodeum; dorsum of thorax, including dorsum of propodeum with large, dense, confluent punctures; propleura, mesopleura and metapleura micropunctate and with a few, scattered, small punctures.

Abdomen black, except the dorsal face of first tergite,

the posterior margin of second tergite, and punctate areas of tergites three to five, ferruginous; clothed with black pubescence, except the anterior face of first tergite with sparse, erect, pale hairs, the dorsal face with appressed, pale pubescence interrupted medially, the second tergite with the broad, lateral margins sparsely, pale pubescent, the antero-lateral angles with elongate spots of sparse, appressed, pale pubescence, the posterior marginal fringe pale interrupted medially with black, and with an elongate ovate, median spot of dense, appressed, golden pubescence, the spot extending to the anterior margin of the tergite, the third tergite with a pair of lateral, transverse spots of dense, appressed, pale pubescence and with the posterior marginal fringe pale, but interrupted medially with black, the fourth, fifth and pygidial tergites with scattered, inconspicuous, pale hairs, most evident laterally, and all the sternites with very sparse, pale pubescence; anterior face of first tergite with scattered, weak, small punctures; junction of anterior and dorsal faces of first tergite coarsely punctate, subasperate; dorsal face of first tergite glabrous, impunctate; second tergite with moderate, dense, confluent punctures, the latter becoming larger and coarser laterally; tergites three to five with moderate, dense punctures; second sternite with moderately large, sparse punctures, the latter becoming close at the posterior margin; sternites three to five with moderate, close to dense punctures at the posterior margin.

Legs black, clothed with sparse, pale pubescence; calcaria ferruginous. — Length, 17 mm.

Holotype. — Female, without locality label (probably from Brazil), in British Museum (Natural History).

This is the only described species with a ferruginous mesonotum and dorsum of propodeum, and a median, elongate ovate, golden pubescent spot on the second tergite. The other species with the mesonotum ferruginous have a linear, pale pubescent spot on the second tergite.

*Hoplocrates monacha* (Gerstaecker) (n. comb.)

1874. *Mutilla monacha* Gerstaecker, Arch. Naturg., vol. 40, p. 47, female.

1897. *Mutilla monacha* Dalla Torre, Cat. Hymen., vol. 8, p. 63, female.

1902. *Mutilla armata* Cresson, Trans. Amer. ent. Soc., vol. 28, p. 28, female (nec Klug). (New synonymy).

1903. *Hoplomutilla monacha* André, Gen. Ins., fasc. 11, p. 47, female.

Lectotype. — Female, Salto Grande, Brazil, in Zoologisches Museum der Universität, Berlin.

## Paratype. — Female, Salto Grande, Brazil [Z. M. U.].

Specimens examine l. — 3 females, Cotia, São Paulo, Brazil (Gericke) [D. E. I., U. M.]; female, Jundiahy, São Paulo, Brazil, November, 1900 (M. Becca) [M. P.]; female, Jundiahy, São Paulo, Brazil (Schrottky) [M. C. S. N.]; 2 females, Itapura, São Paulo, Brazil, January, 1911 (E. Garbe) [M. P., U. M.]; female, Pinheiros, São Paulo, Brazil, August 6, 1927 (C. R. Fischer) [M. P.]; 5 females, Ituverava, São Paulo, Brazil, 1911 (E. Garbe) [M. P.]; female, Franca, São Paulo, Brazil, December, 1902 (O. Dreher) [M. P.]; 2 females, São Paulo, São Paulo, Brazil January, 1922 and May 25, 1924 [D. E. I., U. M.]; female, State São Paulo, Brazil (Hammar) [C. U.]; female, S. Rita de Parnahyba, Goyaz, Brazil [I. B.]; female, Campo Grande, Matto Grosso, Brazil, 1919 [U. M.]; 3 females, Chapada, Matto Grosso, Brazil, December and January [C. M., A. E. S.]; female, Butantan, Brazil, March 26, 1922 [D. E. I.], female, Lassance, E. de Minas, Brazil, June 15, 1911 [I. O. C.]; female, Campos Geraes, Brazil [M. N. H. N.]; 3 females, Brazil [M. P.] 2 females, Sapucay, Paraguay (W. Foster) [B. M., U. M.]; 2 females, Santa Cruz, Bolivia (J. Steinbach) [M. C. Z.]; 7 females, Buena Vista, near Santa Cruz, Bolivia, 1928 (J. Steinbach) [C. U., U. M.]; 4 females, Santa Cruz de la Sierra, Bolivia (J. Steinbach) [C. M., U. M.]; female, Prov. del Sara, Bolivia (J. Steinbach) [C. M.]; 4 females, Yungas de Coroico, Bolivia [M. N. H. N.]; female, Cavinao Beni, Bolivia, February (M. R. Lopez) Mulford Biol. Exp. [U. S. N. M.]; female, Canamina, Bolivia, July (W. M. Mann) Mulford Biol. Exp. [U. S. N. M.]; female, Corioco, Bolivia [Z. M. U.]; female, Urucum, Bolivia? [M. Z. A.]; 8 females, Bolivia [Z. M. U., M. N. H. N., C. U., M. N. B. A., B. M., M. C. S. N.]; female, Amer. merid. [M. N. H. N.]; 3 females, without locality label [M. N. H. N., I. A. S. P.]

One of Gerstaecker's type specimens has been designated as lectotype as indicated above. *Monacha* is similar to *armata* Klug in general appearance but can be recognized at once by the tongue-like process at the posterior median margin of the clypeus. It is apparently limited in distribution to southern Brazil, Paraguay and Bolivia.

*Hoplocrates monacha rubella*, n. var.

Female. — Exactly like *monacha*, but with the integument of the posterior half of mesonotum, and dorsum of propodeum, more or less ferruginous; ferruginous area in holotype confined to integument underlying U-shaped pale pubescent mark; in some of paratypes ferruginous area extends over entire posterior half of mesonotum and extends onto anterior median area of dorsum of propodeum. Length, 16 mm.

Holotype. — Female, Buenavista, near Santa Cruz, Bolivia, 1928 (J. Steinbach), in Cornell University, Ithaca, N. Y.

**Paratypes.** — Female, Buenavista, near Santa Cruz, Bolivia, 1928 (J. Steinbach) [U. M.]; female, Santa Cruz de la Sierra, Bolivia (J. Steinbach) [C. M.]; four females, Yungas de Coroico, Bolivia [M. N. H. M.].

The paratypes vary in length from 11.5 mm. to 16 mm.

*Hoplocrates pompalis*, n. sp.

1854. *Mutilla armata* Burmeister, Abh. naturf. Ges. Halle SitzBer., vol. 2, p. 25, female (in part, Caracas specimens only). (New synonymy).

1855. *Mutilla armata* Smith, Cat. Hymen. Brit. Mus., vol. 3, p. 41, female (in part, Venezuela specimens only). (New synonymy).

1874. *Mutilla armata* Gerstaecker, Arch. Naturg., vol. 40, p. 47, female (in part, Caracas specimens only). New synonymy).

1875. *Mutilla armata* Burmeister, Bol. Acad. nac. Cl. exact. Univ. Cordova, vol. 1, p. 480, female (in part, Caracas specimens only).

1897. *Mutilla armata* Dalla Torre, Cat. Hymen., vol. 8, p. 11, female (in part, Venezuela records only).

*Hoplomutilla armata* André, Gen. Ins., fasc. 11, p. 47, female (in part, Venezuela record only).

1937. *Hoplocrates* sp. Mickel, Rev. Ent. Rio., vol. 7, p. 128, female.

**Female.** — Head entirely black, clothed with black pubescence, except beneath with sparse, erect, pale hairs, the mandibles, clypeus and antennal scrobes with sparse, erect, pale hairs, the scape and first segment of flagellum with sparse, pale pubescence, the vertex with a pair of spots of dense, appressed, pale pubescence, and the genae with sparse, sub-appressed, pale pubescence; hypostomal processes large, massive, subconical; genal process small, curved forward, about one-third the length of the hypostomal process; mandibles edentate at the tip and with two distinct teeth within somewhat remote from the tip; clypeus entirely flat, not at all produced, the anterior margin sinuate, with a pair of weak tubercles medially and a pair of small lateral teeth; antennal tubercles strongly elevated, acutely dentate; flagellar segments ferruginous beneath; front and vertex with moderate, dense punctures; genae with moderately large, separated punctures; postero-lateral angles compressed, prominent.

Thorax entirely black, clothed with black pubescence, except a U-shaped mark on the mesonotum and dorsum of propodeum of thick, appressed, pale pubescence, and posterior face of propodeum and pleural areas with sparse, erect, and fine, appressed pale pubescence, the appressed pubescence thin, except the ventral half of mesopleura and metapleura with the appressed pubescence dense; dorsum of thorax and dorsum of propodeum with large, dense, confluent punctures nearly concealed by the pubescence; posterior face of propodeum and propleura micropunctate and with scattered, small punctures;

sides of propodeum rugoso-punctate posteriorly and ventrally.

Abdomen black, clothed with black pubescence, except the anterior face of first tergite with scattered, erect, pale hairs, the dorsal face of propodeum with dense, appressed, pale pubescence, subinterrupted medially, the lateral margins of second tergite sparsely, pale pubescent, the antero-lateral angles with thick, appressed, pale hairs, a median, anterior, linear, cuneiform spot of dense, appressed, pale pubescence, and the posterior marginal fringe of second tergite pale, interrupted medially with black, the third tergite with dense, appressed, pale pubescence, interrupted medially with black and not extending to the lateral margins, and the posterior marginal fringe of third tergite pale, interrupted medially with black, fourth and fifth tergites with a few, scattered, pale hairs laterally and posteriorly, the pygidial tergite pale pubescent anteriorly and laterally, and all the sternites with sparse, pale pubescence; anterior face of first tergite with scattered, fine punctures; junction of anterior and dorsal faces of first tergite with large, dense punctures, the dorsal face glabrous, impunctate; second tergite with moderate, dense, confluent punctures; tergites three to five with moderate, dense punctures; second sternite with moderate, sparse punctures medially, the punctures becoming larger and closer laterally and posteriorly; sternites three to five with moderate, close to dense punctures posteriorly.

Legs entirely black, clothed with sparse, pale pubescence; calcaria dark ferruginous, almost black. — Length, 19 mm.

Holotype. — Female, Venezuela, in Muséum Nationale d'Histoire Naturelle, Paris.

Paratypes. — 2 females, Dibulla, Colombia [M. N. H. N.]; female, Santa Marta, Colombia, 1896 (Santschi) [M. N. H. N.]; female, Vista Nieve, Santa Marta, Colombia, February 10, 1927 (G. Salt) [G. S.]; female, Minea, Magdalena, Colombia, July 24-25, 1920 [A. E. S.]; 2 females, Minea, Colombia, June [C. M., U. M.]; 3 females, Hacienda Cincinnati, Sierra San Lorenzo, Magdalena, Colombia, July 14, 1920 [A. E. S., U. M.]; female, Valparaiso, Magdalena, Colombia, April [C. M.]; female, Don Amo, Colombia, July [C. M.]; 4 females, Colombia [M. C. S. N., Z. M. U., M. N. H. N.]; female, Therida, Venezuela [Z. M.]; 3 females, Caracas, Venezuela [Z. M., U. S. N. M.]; 3 females, Merida, Venezuela [M. C. S. N., F. I., U. S. N. M.]; 2 females, Maracay, Venezuela [Z. S.]; 3 females, San Esteban, Venezuela [M. N. H. N.]; 3 females, Puerto la Cruz, Venezuela, July 7 [D. E. I.]; 15 females, Venezuela [Z. M., M. C. S. N., S. C., Z. M. H., M. N. H. N., B. M.]; 2 females, Maraval, Trinidad, B. W. I. [A. E. S.]; female, Maracis

Valley, Trinidad, B. W. I., May 26, 1936 (N. A. Weber) [U. M.]; female, Maracas Bay, Trinidad, B. W. I., June 7, 1935 (P. C. Atteck) [U. M.]; female, St. Augustine, Trinidad, B. W. I., April 28, 1934 (A. M. Adamson) [I. C. A.]; female, Port of Spain, Trinidad, B. W. I., December 12, 1924 (H. Ward) [I. C. A.]; female, Cama Valley, Trinidad, B. W. I., July, 1933 (Dr. Vesey-Fitzgerald) [D. V. F.]; female, Trinidad, B. W. I. (H. A. Ballou) [I. C. A.]; 2 females, Trinidad, B. W. I. [A. E. S., B. M.]; female, Surinam [P. M.]; female, Mexico (incorrectly labeled) [M. C. Z.]; female, without locality data [Z. M. U.].

Very similar in superficial appearance to *monacha* Gerst. and *armata* Klug, but differs from both in the unmodified flat clypeus and the strongly dentate antennal tubercles. *Pompalis* has been confused with *armata* Klug by most authors, as indicated by the above synonymy.

### *Hoplocrates munita*, n. sp.

Female. — Head black above, very dark ferruginous beneath, the proximal two-thirds of mandibles, and scape beneath, also dark ferruginous; head beneath clothed with sparse, erect, and short, appressed, pale pubescence; genae with very sparse, appressed, pale pubescence; clypeus and antennal scrobes pale pubescent; front entirely black pubescent; vertex black pubescent, except a pair of large, oblique spots of black, appressed, pale pubescence extending to the posterior eye margins, the spots separated medially by a space equal to the width of the inter-antennal area; scape above, pedicel and first flagellar segment beneath clothed with pale pubescence; mandibles edentate at the tip and with a strong, obtuse tooth on the inner margin remote from the tip; clypeus strongly elevated along the transverse midline and produced medially into a prominent, bidentate process, the small, triangular area posterior to the process densely, deeply punctate, the anterior margin of clypeus also produced medially into a weak, bidentate process, the transverse groove between the marginal process and the median, prominent process closely punctate and pale pubescent; antennal tubercles with a short, strongly elevated, longitudinal carina merging posteriorly into the much less elevated carina bounding the antennal scrobes; front and vertex with moderate, dense, confluent punctures, the black pubescent area of vertex interspersed with numerous spatulate hairs directed posteriorly; postero-lateral angles of head produced into a roundly angulate process defined by a carina, the carina extending down and then curved forward and upward forming a U, and gradually becoming obsolete, not extending to the genal tooth; genae with moderately large,

close, distinct punctures; genal process relatively small and weak, approximately as long as the second flagellar segment, distinctly recurved anteriorly; hypostomal processes large, massive, strongly recurved laterad and cephalad, their tips directed towards the base of the mandible, densely punctate throughout, except a broad, glabrous stripe extending from base to apex adjacent to the inner margin, the latter defined by a carina and weakly, broadly emarginate midway between the base and the apex of the process.

Thorax entirely black; dorsum of thorax clothed with erect and suberect, sparse, black pubescence, except the mesonotum with a transverse, arcuate band of sparse, appressed, pale pubescence on the posterior half, the dorsum of propodeum with a few, scattered, pale hairs in addition to the erect, black hairs, and the posterior face of propodeum with sparse, erect, pale hairs: anterior black pubescent area on pronotum and mesonotum interspersed medially with numerous, spatulate, black hairs projecting posteriorly; humeral angles carinate but not prominent; propleura with scattered, moderate punctures; ventral third of propleura, and ventral half of mesopleura and metapleura clothed with thick, fine, short, appressed, pale pubescence, the remainder of these areas bare and weakly micropunctate; sides of propodeum with close, confluent punctures, the latter becoming weaker and separated towards the anterior margin.

Abdomen black, except the lateral and posterior margins of the tergites and sternites tinged with ferruginous; anterior face of first tergite sparsely, weakly punctate and with sparse, erect, pale hairs; a transverse band of dense, deep punctures at the junction of the anterior and dorsal faces of first tergite; dorsal face of first tergite clothed with dense, appressed, pale pubescence, the pubescent band thus formed subinterrupted medially; second tergite very densely punctate and black pubescent, except lateral fifths with sparse, erect, pale hairs, the felt lines pale, a pair of elongate spots of sparse, appressed, pale pubescence on the anterior half mesad of the felt lines, a median, anterior, subcuneiform spot of dense, appressed, pale pubescence extending beyond the transverse midline, and the posterior margin with a fringe of pale hairs distinctly interrupted medially with black; second tergite densely punctate, clothed with dense, appressed, pale pubescence, and sparse, erect, pale hairs, except sparse, black pubescence medial-



ly, thus forming a broad band interrupted medially and not extending to the lateral margins, a narrow, lateral area each side with only the erect, pale hairs; tergites four and five densely punctate, clothed with sparse, fuscous hairs, except a few, pale hairs at the lateral margins; pygidial tergite densely punctate and sparsely, pale pubescent, except the large, well defined pygidial area bare and granulate throughout; first sternite clothed with sparse, erect, pale hairs and short, sub-appressed, pale pubescence, elevated along the midline anteriorly, but without a definite, median, longitudinal carina; second sternite with moderate, distinct, separated punctures medially, the latter becoming smaller and sparser anteriorly, closer and deeper towards the lateral and posterior margins, clothed throughout with sparse, pale hairs, sternites three to five with moderate, dense punctures posteriorly, clothed with sparse, pale hairs; last sternite finely punctate and pale pubescent at the postero-lateral angles.

Legs very dark ferruginous, sparsely clothed with pale hairs; calcaria very dark ferruginous. — Length 20 mm.

Holotype. — Female, R. Amazzoni (Amazon river, no other locality data) (Emery), in Museo Civico di Storia Naturale, Genoa, Italy.

The clypeal process of this species is somewhat similar to that of the two following species, but is more erect, more prominent, and with a deeper emargination between the teeth. It is readily separated from *voluptuosa* by the entirely black thorax, and differs from both *voluptuosa* and *penthesilea* in the form of the hypostomal processes which are more robust and more strongly recurved, and the pubescent pattern of the dorsum of thorax.

*Hoplocrates voluptuosa* (Gerstaecker) (n. comb.)

1874. *Mutilla voluptuosa* Gerstaecker, Arch. f. Naturg., vol. 40, p. 47, female.

1897. *Mutilla colaptuosa* Dalla Torre, Cat. Hymen., vol. 8, p. 98, female.

1903. *Hoplomutilla voluptuosa* André, Gen. l. s., fasc. 11, p. 47, female.

Lectotype. — Female, Bogotá, Colombia (Lindig), in Zoologisches Museum der Universität, Berlin.

Paratype. — Female, same locality data and in same collection.

Specimens examined: Female, Bogotá, Colombia [D. E. 1.]; 2 females, Colombia [M. C. S. N., S. C.].

The type material of this species has been studied, a lectotype selected, and two of the above specimens were compared with type. There are several species in this genus that

have the dorsum of the thorax ferruginous, hence that color character cannot be relied upon for identification. The form of the clypeus in *voluptuosa* is characteristic; the median process on the transverse midline has a much larger triangular area posterior to it than the preceding species, and this area is weakly, closely punctate; the hypostomal processes are erect and attenuated distally to form a short, slender cylindrical process slightly recurved laterad; the pubescence of the ferruginous area of thorax is sparse, appressed and golden, interspersed throughout with scattered, long, erect, black hairs, and with a cluster of dark ferruginous, spatulate hairs at the median, posterior margin of the mesonotal area.

*Hoplocrates penthesilea*, n. sp.

Female. — Head black, except proximal two-thirds of mandibles, scape beneath and flagellar segments 2-11 beneath, tinged with dark ferruginous; head clothed beneath with sparse, erect and subappressed, pale pubescence; clypeus and genae sparsely, pale pubescent; front and vertex black pubescent, except the vertex with a pair of lateral spots of thick, appressed, pale pubescence, the spots extending almost to the posterior margin of the eyes and merging laterally with the pale pubescence of the genae; mandibles edentate at the tip and with two teeth within remote from the tip, the distal tooth small and inconspicuous, the proximal tooth large and obtuse; clypeus elevated along the transverse midline and the elevation produced medially into a weakly bidentate process, the triangular area posterior to the process densely, shallowly punctate; clypeal process projecting beyond anterior margin of clypeus; scape, pedicel, and first flagellar segment beneath clothed with pale pubescence; front and vertex with dense, moderate punctures; genae with moderate, distinct, close punctures; postero-lateral angles of head carinate, the carina terminating abruptly caudad, thus dentate; genal process small, not noticeably recurved anteriorly; hypostomal process very large, punctate, its inner margin defined by a carina, erect, attenuated distally into a short, cylindrical process, the latter slightly recurved laterad.

Thorax entirely black; pronotum clothed with black pubescence interspersed with numerous spatulate black hairs; mesonotum and dorsum of propodeum clothed throughout with sparse, subappressed, pale pubescence; posterior face of pro-

podeum clothed with short, thick, pale pubescence and sparse, erect, pale hairs; pleural areas clothed throughout with short, thick, subappressed, pale pubescence; sides of propodeum mostly glabrous, except a few, scattered punctures throughout and closely punctate at the posterior margin; pronotum, mesonotum and dorsum of propodeum with moderate, dense punctures; humeral angles carinate but not prominent; pleural areas impunctate, except the pleura with a few, scattered, weak punctures.

Abdomen piceous, almost black; anterior face of first tergite with scattered small punctures and sparse, erect, pale hairs; dorsal face of first tergite clothed with dense, appressed, pale pubescence, forming a broad, transverse, pale pubescent band subinterrupted medially; junction of anterior and dorsal faces of first tergite densely punctate; second tergite with moderate, dense punctures throughout, sparsely, black pubescent, except broad, lateral margins sparsely, pale pubescent, felt lines pale, an indistinct, elongate spot of sparse, appressed, pale pubescence mesad of each felt line, an elongate, subcuneiform spot of dense, appressed, pale pubescence medially extending from the anterior margin to slightly beyond the transverse midline, and a posterior marginal fringe pale, but distinctly interrupted medially with black; third tergite with dense, moderate punctures, clothed with dense, appressed, pale pubescence and with a pale, posterior marginal fringe, except both interrupted medially with black, and the dense, appressed pubescence terminating before the lateral margin of the tergite; tergites four and five with dense, moderate punctures and sparse, erect, fuscous pubescence; pygidial tergite densely punctate and sparsely, pale pubescent at the lateral and posterior margins of the large pygidial area; first sternite sparsely, pale pubescent, very weakly, sparsely punctate, and elevated along the longitudinal midline, but without a median, longitudinal carina; second sternite with sparse, moderate punctures, the latter becoming close at the lateral and posterior margins; sternites three to five with moderate, deep, close punctures and sparse, erect, pale hairs; last sternite with small, distinct, close punctures posteriorly.

Legs dark ferruginous, clothed with sparse, pale pubescence; calcaria dark ferruginous. — Length, 13 mm.

Holotype. — Female, Merida, Venezuela, in Musco Civico di Storia Naturale, Genoa, Italy.

Similar to *voluptuosa* in the form of the clypeus and the hypostomal processes, but differs in the entirely black thorax, and in the mesonotum and dorsum of propodeum clothed with sparse, pale pubescence throughout, without interspersed black hairs and without spatulate hairs.

*Hoplocrates armata* (Klug) (n. comb.)

1821. *Mutilla armata* Klug, N. Acta. Acad. Caes. Leop. Carol., vol. 10, p. 323, T. 13, f. 12, female.  
 1854. *Mutilla armata* Burmeister, Abh. naturf. Ges. Halle, SitzBer., vol. 2, p. 25, female (in part, Para specimens only).  
 1855. *Mutilla armata* Smith, Cat. Hymen. Brit. Mus., vol. 3, p. 41, female (in part, Para specimens only).  
 1824. *Mutilla armata* Gerstaecker, Arch. f. Naturg., vol. 40, p. 47, female (in part, Para specimens only).  
 1875. *Mutilla armata* Burmeister, Bol. Acad. Nac. Ci. exact, Univ. Cordova, vol. 1, p. 480, female (in part, Para specimens only).  
 1897. *Mutilla armata* Dalla Torre, Cat. Hymen., vol. 8, p. 11, female (in part).  
 1903. *Hopломutilla armata* André, Gen. Ins., fasc. 11, p. 47, female (in part).

Type. — Female, Para, Brazil (Sieber), in Zoologisches Museum der Universität, Berlin.

Specimens examined. — Female, Para, Brazil (Bates and Wallace) [S. C.]; female, Para, Brazil (W. M. Mann) [U. S. N. M.]; three females, Para, Brazil [B. M.], two females, Belem, Para (Bates) [Z. SS.]; female, Belem, Para, June, 1924 (F. X. Williams) [U. M.]; female, Brazil [S. C.]; female, Ivon Beni, Bolivia, February (W. M. Mann) Mulford Biological Expedition [U. S. N. M.].

The type has been studied and five of the above specimens were compared with it. *Armata* is very similar in appearance to *pompilis* but the clypeus in *armata* is strongly bituberculate or even bidentate at the anterior margin, slightly elevated at the posterior middle with a broad, shallow transverse groove between the two; the antennal tubercles are less dentate in *armata* than in *pompilis*, and the hypostomal processes are more robust and irregular in outline.

The specimen indicated above from Bolivia has probably been mislabeled. It is very unlikely that the species occurs in Bolivia; all the other specimens known are from the region near the mouth of the Amazon river.

*Hoplocrates tartarina*, n. sp.

Female. — Head piceous to black, the mandibles distally, the flagellum beneath slightly, and the hypostomal processes all tinged with ferruginous; head beneath with sparse, erect, pale pubescence; mandibles proximally and clypeus sparsely, pale pubescent; genae with sparse, recumbent pubescence; front and vertex with sparse, black pubescence, except the

vertex with a pair of lateral, oblique, subrectangular spots of dense, appressed, pale pubescence; scape, pedicel and first segment of flagellum clothed with sparse, pale pubescence; mandibles edentate at the tip and with a large, obtuse tooth within remote from the tip, the usual small tooth between tip and obtuse tooth apparently eroded; clypeus with a pair of prominent, anterior, median, submarginal tubercles, projecting beyond the median, weakly bituberculate, anterior margin; median area of clypeus margined posteriorly; antennal tubercles subdentate; front and vertex with moderate, dense, confluent punctures, the anterior part of front with punctures somewhat larger than elsewhere; genae with moderate, distinct, close punctures; postero-lateral angles very strongly carinate, the carina bending anteriorly, becoming very weak and extending to the genal process; genal process small, directed somewhat anteriorly; hypostomal processes very large, punctate anteriorly, glabrous, impunctate posteriorly, distinctly recurved laterally at the tip.

Thorax black, except the dorsum bright ferruginous; the ferruginous area deeply, broadly and roundly emarginate anteriorly due to a black, median area at the anterior margin of mesonotum, and narrowed posteriorly due to lateral areas of dorsum of propodeum black; pronotum and black anterior area of mesonotum clothed with sparse, erect, black pubescence, intermixed with erect, spatulate black hairs; ferruginous area of dorsum of thorax rubbed in holotype, but apparently with sparse, pale pubescence and scattered, erect, pale hairs; black, lateral areas of dorsum of propodeum with sparse, erect, dark hairs; posterior face of propodeum very sparsely, pale pubescent; pleural areas with short, dense, appressed, pale pubescence on ventral two-thirds of mesopleura and metapleura, very sparse, short, pale pubescence elsewhere; black, anterior area of dorsum of thorax with moderate, dense, confluent punctures, the remainder with moderately large, dense punctures; posterior face of propodeum glabrous, only weakly micropunctate; humeral angles carinate, but not prominent; pleural areas with only a few, scattered, moderate punctures; sides of propodeum densely punctate at the posterior margin.

Abdomen black, except lateral and posterior margins of tergites, a large, elongate spot at each antero-lateral angle, first sternite, second sternite for the most part, and broad, posterior margins of sternites, all ferruginous; anterior face

of first tergite with small, scattered punctures and sparse, erect, pale hairs; junction of anterior and dorsal faces of first tergite densely, coarsely punctate; dorsal face of first tergite clothed with dense, appressed, pale pubescence, interrupted medially with black; second tergite densely, coarsely punctured, clothed with sparse, black pubescence, except a median, anterior, subcuneiform spot of dense, appressed, pale pubescence in a slight depression and extending to the transverse midline, sparse, erect, pale ferruginous hairs on the antero-lateral, ferruginous spots, felt lines pale, lateral margins with sparse, pale pubescence, and posterior margin with a thin fringe of pale hairs interrupted medially with black; third tergite densely punctate, with a pair of moderate, transverse spots of dense, appressed, pale pubescence separated by a broad, median area of sparse, black pubescence, the area laterad of the spots with sparse, pale pubescence, the posterior marginal fringe thin throughout, black medially, pale laterally; tergites four and five densely punctate, clothed with sparse, fuscous to black pubescence, except the lateral, submarginal areas sparsely, pale pubescent; lateral and posterior areas of pygidial tergite densely punctate and pale pubescent adjacent to the pygidial area; lateral, anterior, marginal areas of first sternite weakly punctate and sparsely, pale pubescent, the remainder of sternite glabrous, impunctate; second sternite with moderate, distinct, separated punctures, becoming close at the sides, almost dense at the posterior margin, small and weak on the median, anterior area, the sternite clothed with very sparse, pale hairs, and a thin, posterior marginal fringe of pale hairs; sternites three to five densely punctate posteriorly, clothed with sparse, pale hairs, and a thin, inconspicuous, pale, posterior marginal fringe; last sternite with small, close punctures laterad, and thick pale hairs posteriorly.

Legs dark ferruginous, clothed with sparse, pale pubescence; calcaria dark ferruginous. — Length, 17 mm.

Holotype. — Female, Pasto, Colombia, in Muséum Nationale d'Histoire Naturelle, Paris.

Closely resembles *voluptuosa* but clypeus differs as described above, black area on mesonotum is more extensive, ferruginous spots at antero-lateral angles of second tergite are conspicuous, and pale pubescent markings on second tergite are much weaker and smaller than in *voluptuosa*. Note that posterior margin of median area of clypeus is defined by a weak carina in *tartarina* but is not defined in *voluptuosa*.

*Hoplocrates admiranda*, n. sp.

**Female.** Head black, except mandibles tinged with ferruginous slightly beyond the middle, and flagellum ferruginous beneath; head beneath clothed with sparse, erect, pale pubescence; proximal two-thirds of mandibles, clypeus and antennal scrobes clothed with sparse, pale pubescence; genae clothed with sparse, recumbent pubescence; front and vertex clothed with sparse, black pubescence, except the vertex with a pair of subquadrate spots of dense, appressed, very pale golden pubescence, merging into the pale pubescence of genae laterally; mandibles edentate at the tip, with a small tooth within remote from the tip, and a large, obtuse tooth proximad of the smaller one; clypeus distinctly bituberculate medially at the anterior margin and with a pair of distinct tubercles immediately posterior to the marginal ones; median area of clypeus behind the tubercles finely, closely punctate throughout and distinctly margined posteriorly; antennal tubercles distinctly dentate; scape, pedicel and first segment of flagellum clothed with sparse, pale pubescence; front with large, dense, contiguous punctures, the vertex with moderate, dense, contiguous punctures; genae with moderately large, close, distinct punctures; postero-lateral angles strongly carinate, the carina bending anteriorly and becoming very weak, then directed forward; hypostomal process very large, punctate, except the inner face glabrous, the tip distinctly recurved laterad.

Thorax entirely black; the dorsum clothed with sparse, black pubescence, except the median area of mesonotum with very sparse, inconspicuous, recumbent, very pale golden pubescence, the pronotal black pubescence intermixed with black, spatulate hairs; dorsum of propodeum with sparse, erect, black hairs, posterior face of propodeum clothed with sparse, inconspicuous, erect, pale hairs, and short, sparse, pale pubescence; pleural areas, clothed with short, appressed, pale pubescence, very thick on the ventral two-thirds of mesopleura and metapleura, and with scattered, erect, pale hairs; pronotal area with moderate, dense, contiguous punctures; mesonotum and dorsum of propodeum with large, dense, somewhat confluent punctures; posterior face of propodeum almost impunctate; humeral angles carinate but not prominent; pleural areas micropunctate, otherwise almost impunctate, except for a few scattered punctures; sides of propodeum rugoso-punctate towards the posterior margin.

Abdomen black, except posterior margins of tergites and sternites tinged with ferruginous; anterior face of first tergite with small, sparse punctures and sparse, erect, pale hairs; junction of anterior and dorsal faces of first tergites densely punctate; dorsal face of first tergite clothed with dense, appressed, very pale golden pubescence forming a broad, transverse band, very narrowly interrupted medially by a glabrous line; second tergite with moderate, dense, confluent punctures, clothed with sparse, black pubescence, except a cuneiform spot of dense, appressed, very pale golden pubescence extending from the anterior margin to slightly beyond the middle, very sparse, pale hairs on the antero lateral areas, pale felt lines, sparse, pale pubescence at the lateral margins and a thick fringe of very pale golden pubescence at the posterior margin, widely interrupted medially with black hairs and the fringe becoming thin at the postero-lateral angles; third tergite densely punctate, clothed with dense, appressed, very pale golden pubescence, very widely interrupted medially with sparse, dark hairs, and the appressed pubescence not extending to the lateral margins, thus forming a pair of narrow, transverse spots, the posterior margin of the tergite with a moderately thick fringe of very pale golden hairs; tergites four and five densely punctate, clothed with intermixed, sparse, subappressed, short, pale fuscous hairs, and sparse, erect, black hairs; lateral and posterior areas of pygidial tergite adjacent to pygidial area densely punctate and with erect, pale fuscous hairs; lateral faces and anterior third of first sternite weakly punctate and sparsely, pale pubescent, the ventral, triangular area glabrous, bare, impunctate; second sternite punctate, the punctures small and very sparse on the median, anterior area, becoming larger and closer laterally and posteriorly, clothed with sparse, erect, pale hairs, and a thin, posterior marginal fringe of pale hairs; sternites three to five closely punctate, with sparse, pale hairs and a very thin, posterior marginal fringe of pale hairs; last sternite with small, close punctures laterally, and erect, pale fuscous hairs.

Legs piceous to black, clothed with sparse, pale hairs; calcaria ferruginous. Length, 17 mm.

Holotype. — Female, Tena, Ecuador, Feb. 14, 1923 (F. X. Williams), in University of Minnesota collection.

Paratype. — Female, Equitos, in Deutsches Entomologisches Institut, Berlin-Dahlem, Germany.



The quadrituberculate clypeus, with the median area margined posteriorly, and the entirely black thorax serve to identify this species. Very similar in superficial appearance to *armata* Klug.

*Hoplocrates oblectanea*, n. sp.

Female. — Head black, except the mandibles tinged with ferruginous slightly beyond the middle, and the flagellum tinged with ferruginous beneath; head beneath clothed with sparse, erect, pale hairs; proximal two-thirds of mandibles, clypeus, and antennal scrobes clothed with sparse, erect, pale hairs; genae clothed with sparse, recumbent, pale hairs; front and vertex clothed with sparse, black pubescence, except the vertex with a pair of large, lateral, subtriangular spots of thick, but not dense, subappressed, pale pubescence, merging into the pale pubescence of the genae; mandibles edentate at the tip, with a small tooth within remote from the tip, and a large, obtuse tooth within proximal of the smaller one; clypeus bituberculate medially at the anterior margin and with a pair of distinct, submarginal tubercles immediately posterior to the marginal ones; median area of clypeus behind submarginal tubercles weakly, shallowly punctate, and margined posteriorly; antennal tubercles conspicuously dentate; scape, pedicel and first segment of flagellum clothed with sparse, pale pubescence; front with moderately large, dense punctures; vertex with very dense, somewhat smaller punctures; genae with moderately large, close, distinct punctures; postero-lateral angles of head strongly, prominently carinate, the carina bent forward ventrally, but practically obsolete between postero-lateral angles and the genal process; genal process small, distinctly directed forwards; hypostomal processes very large, punctate, except the narrow, inner face of each glabrous, impunctate, the tip recurved laterad.

Thorax black, except the mesonotum, excluding an anterior triangular area, and most of the dorsum of propodeum, ferruginous; pronotum and adjacent triangular black area on mesonotum clothed with sparse, black pubescence, and intermixed with sparse, black, spatulate hairs, except the sparse, ferruginous, recumbent hairs of mesonotum encroaching onto the black area of mesonotum and dorsum of propodeum clothed with very sparse, recumbent, ferruginous hairs, sparse, erect, black hairs, and with a few, spatulate hairs on a small, piceous spot at the posterior margin of mesonotum midway

and slightly anterior to a transverse line between the propodeal spiracular tubercles; posterior face of propodeum clothed with thick, short, pale pubescence and sparse, erect, pale hairs; pleural areas clothed with short, pale pubescence, very thick on the ventral two-thirds of the mesopleura and metapleura, and with scattered, erect, pale hairs; pronotum with dense, moderate punctures; mesonotum and dorsum of propodeum with large, dense, confluent punctures, the punctate area extending laterally onto the posterior face of propodeum, the latter otherwise only micropunctate; humeral angles carinate but not prominent; pleural areas micropunctate, otherwise with only a few, scattered punctures on the propleura; sides of propodeum striato-punctate except the dorsal third glabrous, only micropunctate

Abdomen black, except the posterior and lateral margins of the tergites, and the posterior margin of the sternites ferruginous; anterior face of first tergite with sparse, small punctures and sparse, erect, pale pubescence; junction of anterior and dorsal faces of first tergite densely, coarsely punctate; dorsal face of first tergite clothed with dense, appressed, pale pubescence, forming a transverse band distinctly interrupted medially by a narrow, bare, glabrous area; second tergite very densely, coarsely punctate, clothed with sparse, black pubescence, except a median, anterior, cuneiform spot extending from near the anterior margin to beyond the transverse midline, of dense, appressed, pale pubescence, the anterolateral areas with sparse, inconspicuous, recumbent, pale hairs, pale felt lines, lateral margins with sparse, pale hairs, and a posterior marginal fringe of pale hairs, thin laterally, thick elsewhere and distinctly interrupted medially with black hairs; third tergite densely punctate, with a pair of transverse spots of dense, appressed, pale pubescence broadly separated medially with sparse, black pubescence, and not extending to the lateral margins, the lateral areas with sparse, pale hairs, and the tergite also with a posterior marginal fringe of pale hairs, thin laterally, thick elsewhere, except broadly interrupted medially with black hairs; fourth and fifth tergites densely punctate and clothed with sparse, fuscous hairs, except pale hairs near the lateral margins; lateral and posterior areas of pygidial tergite adjacent to pygidial area densely punctate and clothed with sparse, erect, pale hairs; lateral faces and narrow, anterior area of first sternite clothed

with thick, short, pale pubescence and sparse, erect, pale hairs, the median, posterior, triangular area flat, glabrous and bare; second sternite with small, sparse punctures on the anterior, median area, the punctures becoming larger and closer towards the lateral and posterior margins, at the posterior margin large and practically contiguous; second sternite clothed with sparse, erect, pale hairs, and with a thin, posterior marginal fringe of pale hairs; sternites three to five densely punctate posteriorly, clothed with sparse, erect, pale hairs and each with a thin, posterior marginal fringe of pale hairs; postero-lateral areas of last sternite with small, close punctures and erect, pale hairs.

Legs piceous, clothed with sparse, pale hairs; calcaria ferruginous. — Length, 18 mm.

Holotype. — Female, Nanta, Amazon, Brazil, in British Museum (Natural History), London.

Paratypes. — Female, Upper Amazon, Brazil [S. C.]; female São Paulo, Amazon superior, Brazil [Z. M.]; female, Teffé, Brazil (Raulin) Thayer Expedition [M. C. Z.].

Related to *admiranda* in the form of the clypeus, hypostomal processes and pubescent pattern. Differs in the ferruginous dorsum of thorax and the obsolete carina between the postero-lateral angles and genal process. The paratypes vary in length from 13 mm to 18 mm.

*Hoplocrates maculipennis* (Smith) (n. comb.)

1879. *Mutilla maculipennis* Smith, Descr. New Species Hymen., p. 219, male.

1897. *Mutilla maculipennis* Dalla Torre, Cat. Hym., vol. 8, p. 56, male.

1903. *Mutilla maculipennis* André, Gen. Ins., fasc. 11, p. 73, male.

Type. — Male, Ega, Brazil, in British Museum (Natural History), London.

The unique type has been examined and runs in the key to the males as indicated.

*Hoplocrates albifrons*, n. sp.

Male. — Head entirely black, clothed with pale pubescence, except the anterior half of vertex sparsely, fuscous-pubescent, the pale pubescence on the clypeus, antennal scrobes, outer orbits of eyes and front thick and conspicuous; mandibles edentate at the tip, with a small tooth within near the tip and a large, obtuse tooth proximad of the smaller one; clypeus closely punctate medially; antennal tubercles prominent, angulate dorsally; scape punctate and pale pubescent.

above, front and vertex with moderate, close, somewhat confluent punctures; lateral areas of vertex with a shallow groove extending from the posterior eye margins to the caudal margin of head; genae with moderate, close to dense punctures; postero-lateral angles of head angulate, but not produced and prominent; genal process short, distinctly shorter than the second flagellar segment, a weak carina extending from the process to the postero-lateral angles of head; hypostoma weakly dentate each side posteriorly, the teeth very small, and subacute; distance between the posterior margin of eyes and the postero-lateral angles equal to the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except the dorsal face of pronotum, mesonotum entirely and anterior three-fourths of scutellum with sparse, black pubescence, the pale pubescence on the dorsum of propodeum very dense and conspicuous, that on the mesopleura thicker than remainder of pleural areas; anterior face of pronotum micropunctate; dorsal face of pronotum with moderate, dense, confluent punctures laterally, the punctures distinct and separated medially; lateral margins of dorsal face of pronotum distinctly tuberculate medially; mesonotum with moderate, distinct, contiguous punctures; parapsidal furrows distinct and complete from anterior to posterior margins of mesonotum; scutellum strongly, evenly convex, with moderately large, dense, confluent punctures; mesonotum punctate medially; sculpture of dorsum of propodeum entirely concealed by the dense, appressed, pale pubescence; posterior face of propodeum weakly reticulate; anterior margin of propleura distinctly carinate; propleura almost bare, weakly micropunctate and with a few, small, scattered punctures; broad, anterior margin of mesopleura micropunctate, the remainder with moderately large, close, confluent punctures, the dorsal third distinctly elevated and somewhat more densely punctate; mesopleura micropunctate for the most part, but posteroventrally closely punctate, and the dorsal third faintly, longitudinally rugose; sides of propodeum narrowly, distinctly reticulate.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second, the first tergite with anterior and dorsal faces; anterior face of first tergite with sparse punctures and sparse, erect, pale hairs, the dorsal face clothed with dense, appressed, pale pubescence

concealing the sculpture; second tergite with small punctures, distinct and well separated on the median, anterior area, very close, almost contiguous laterally and posteriorly; second tergite clothed with sparse, black pubescence, except a pair of triangular spots covering the antero-lateral areas and with their apices contiguous at the anterior margin medially, of thick, appressed, pale pubescence, the felt lines pale, a few scattered, erect, pale hairs between the felt lines and the lateral margins, and a thin, posterior marginal fringe pale; but broadly interrupted medially with black; tergites three to six with small, close punctures; third tergite clothed with dense, appressed, pale pubescence, but broadly interrupted medially with black; fourth tergite with the lateral fourths pale pubescent; fifth and sixth tergites sparsely, black pubescent, except a few, erect, pale hairs at the lateral margins; last tergite closely punctate on the anterior half, the posterior half occupied by a pygidial area, strongly granulate; first sternite sparsely, pale pubescent, without a median, longitudinal carina; second sternite with moderately small, very sparse punctures, the latter close at the extreme posterior margin, clothed throughout with sparse, erect, pale hairs; sternites three to six with moderately small, close punctures posteriorly, and with sparse, erect, pale hairs; last sternite with small, close punctures and sparse, erect, pale hairs.

Legs black, sparsely clothed with erect, pale hairs; intermediate and posterior tibiae densely punctate above; calcaria dark brown. -- Length, 14 mm.

Holotype. -- Male, Obidos, Brazil, 1904 (P. Lecointe), in Muséum National d'Histoire Naturelle, Paris.

Paratypes. — Male, Santarem, Brazil, May, 1919 (S. M. Klages) (wings broken off) [C. M.]; male, Teffé, September 26, 1904 (Ducke) [U. M.].

Related to *maculipennis* to which it is very similar, differing as expressed in the key to the males. This may be the same as *maculipennis*, but no specimens of the latter are available for comparison and the head appears to be less strongly quadrate in *albifrons*. The form of the hypostoma and its processes should also be compared in the two.

*Hoplocrates buccata*, n. sp.

Male. — Head entirely black, clothed with sparse, pale pubescence, except the clypeus and antennal scrobes with the pale pubescence thick, the front from slightly anterior to the an-

terior ocellus and the vertex with sparse, black pubescence; pale pubescence on anterior two-thirds of front sparse and inconspicuous; mandibles edentate at the tip, with a small tooth within near the tip, and a large, obtuse tooth proximad of the smaller one; median area of clypeus densely punctate; antennal tubercles prominent, angulate dorsally; scape closely punctate and clothed with sparse, pale pubescence; front, vertex and genae with moderate, close, somewhat confluent punctures; postero-lateral angles of head angulate but not produced and prominent; genal process distinctly shorter than the second segment of flagellum; hypostoma strongly elevated and produced into a pair of distinct teeth (one each side), the head transversely buccate each side adjacent to the tooth, forming a short, transverse ridge extending laterad a distance equal to the length of the genal process; distance between the posterior margin of the eyes and the postero-lateral angles only slightly greater than the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except the dorsal face of pronotum, mesonotum entirely, and anterior two-thirds of scutellum with sparse, black pubescence, the pale pubescence on the dorsum of propodeum dense and appressed, concealing the sculpture, that on the mesopleura somewhat thicker than remainder of pleural areas; anterior face of pronotum micropunctate; dorsal face of pronotum densely punctate, except the impunctate, posterior margin; lateral margins of dorsal face of pronotum distinctly tuberculate medially; mesonotum with moderate, contiguous, somewhat confluent punctures; parapsidal furrows distinct from anterior to posterior margins of mesonotum; scutellum strongly convex, with large, dense punctures; metanotum densely punctate medially; posterior face of propodeum shallowly reticulate; propleura sharply carinate at the anterior margin, micropunctate, and with a shallow, posterior, submarginal groove weakly, transversely rugose; broad, anterior and posterior margins of mesopleura micropunctate, the remainder with dense, moderate punctures, the dorsal third somewhat elevated; metapleura micropunctate, except ventrally moderately punctate, and the dorsal third distinctly, longitudinally rugose; sides of propodeum deeply, narrowly reticulate.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at its junction with the second, the first

tergite with anterior and dorsal faces; anterior face of first tergite with very sparse punctures, and sparse, erect, pale hairs; dorsal face of first tergite punctured, the punctures obscure but visible through the dense, appressed, pale pubescence; second tergite with moderate, close punctures on the median, anterior area, becoming dense on the lateral and posterior areas; second tergite clothed with sparse, black pubescence, except the antero-lateral areas, each with a triangular spot of sparse, appressed and erect, pale hairs, the apices of these triangular spots contiguous at the middle of the anterior margin, felt lines pale, a few, scattered, erect, pale hairs between the felt lines and the lateral margins, and the thin, posterior marginal fringe pale, but broadly interrupted medially with black; tergites three to six with small, contiguous punctures; lateral thirds of third tergite clothed with thick, appressed, pale pubescence and sparse, erect, pale hairs, the median third black pubescent; tergites four to six sparsely, pale pubescent at the lateral margins; anterior area of last tergite closely punctate, the pygidial area distinctly granulate; first sternite sparsely pale pubescent, without a median, longitudinal carina; second sternite with small, very sparse punctures, the latter close at the posterior margin, and clothed throughout with sparse, erect and suberect, pale hairs; sternites four to six with moderately small, close but not contiguous punctures, and clothed with sparse, erect, pale hairs; last sternite with small, close punctures and sparse, erect, pale hairs.

Legs black, clothed with sparse, erect, pale hairs; intermediate and posterior tibiae coarsely punctate above; calcaria dark brown. — Length, 15 mm.

Holotype. — Male, Rio Itaya, Iquitos, Peru, 1930 (Hedicke), in Zoologisches Museum der Universität, Berlin, Germany.

Related to *maculipennis* and *albifrons* but has the hypostomal processes and adjacent area as defined above, the front with only sparse, inconspicuous, pale pubescence, and the antero-lateral areas of second tergite less thickly, pale pubescent.

*Hoplocrates illex*, n. sp.

Male. — Head entirely black, clothed with sparse, pale pubescence beneath, the clypeus and antennal scrobes with thick, pale pubescence, the front and vertex with sparse, black

pubescence and a few, obscure pale hairs immediately above the antennal tubercles, and the genae with intermixed, sparse, black and obscurely pale pubescence; mandibles edentate at the tip, with a small tooth within near the tip, and a large, obtuse tooth proximad of the small one; median area of clypeus finely, weakly punctate; antennal tubercles slightly angulate; scape closely punctate above and clothed with sparse, pale hairs; front with small, very dense punctures; vertex and genae with moderately small, contiguous, somewhat confluent punctures; postero-lateral angles of head angulate, but not produced and prominent; genal process short, distinctly shorter than the second flagellar segment; hypostoma with a distinct, acute tooth each side posteriorly, the head not elevated or swollen adjacent to the tooth; distance between posterior margin of eyes and postero-lateral angles of head one and one-fifth times the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except the dorsal face of pronotum, mesonotum entirely and nearly all of the scutellum, with sparse, black pubescence, the pale pubescence on the dorsum of propodeum dense and concealing the sculpture, and that on the mesopleura thicker than elsewhere on the pleural areas; dorsal face of pronotum with small, dense, somewhat confluent punctures, except a narrow, posterior margin glabrous, impunctate; lateral margins of dorsal face of pronotum tuberculate medially; mesonotum with small, dense, confluent punctures; parapsidal furrows present and complete, but not conspicuous; scutellum strongly and evenly convex, with moderate, dense, confluent punctures; metanotum densely punctate medially; posterior face of propodeum shallowly reticulate; propleura with the anterior margin sharply carinate, micropunctate throughout; broad, anterior and posterior margins of mesopleura micropunctate, otherwise with moderate, close to dense, somewhat confluent punctures, the dorsal third slightly elevated; metapleura micropunctate, except ventrally closely punctate, and the dorsal third very weakly, longitudinally rugose; sides of propodeum narrowly reticulate.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second, the first tergite with an anterior and dorsal face; anterior face of first tergite with sparse, small punctures and sparse, erect, pale hairs; dorsal face of first tergite clothed with dense,



appressed, pale pubescence concealing the sculpture; second tergite with small, distinct, separated punctures on the anterior middle, the punctures becoming close and dense posteriorly and laterally; second tergite clothed with sparse, black pubescence except the antero-lateral areas, each with a triangular spot of dense, appressed, pale pubescence, the apices of the spots contiguous at the middle of the anterior margin, felt lines pale, a few scattered, erect, pale hairs between the felt lines and the lateral margins, and a thin, posterior marginal fringe pale, but broadly interrupted medially with black; tergites three to six with small, shallow, dense punctures; lateral thirds of third tergite clothed with thick, appressed, pale pubescence and sparse, erect, pale hairs, the median third black pubescent; fourth tergite with the lateral fifths sparsely, pale pubescent, the remainder sparsely, black pubescent; tergites five and six with sparse, black pubescence, except a few, erect, pale hairs at the lateral margins; anterior area of last tergite with small, very close punctures and sparse, black pubescence, the pygidial area distinctly granulate; first sternite with sparse, pale pubescence, without a median, longitudinal carina; second sternite with very sparse, small punctures, the latter a little closer at the posterior margin, and with sparse, erect, pale hairs; sternites three to six with small punctures, close at the posterior margin, and clothed with sparse, erect, pale hairs; last sternite with small, close punctures and sparse, erect, pale hairs.

Legs entirely black, sparsely clothed with erect, pale hairs; intermediate and posterior tibiae coarsely punctate above; calcaria black. — Length, 13 mm.

Holotype. — Male, Santa Cruz, Bolivia (J. Steinbach), in Cornell University, Ithaca, New York.

Related to the three preceding species, all having the genal tooth short. Differs from all three in having the front black pubescent, the very weakly punctate, median area of the clypeus and the smaller, denser punctuation of the front and mesonotum

*Hoplocrates dentigula*, n. sp.

Male. — Head entirely black, clothed beneath with sparse, erect, pale pubescence, the clypeus and antennal scrobes with thick, pale pubescence, the area between and above the antennal tubercles with appressed, pale pubescence, the narrow area immediately posterior to the antennal scrobes

with intermixed pale and black pubescence, the anterior two-thirds of genae clothed with sparse, appressed, pale pubescence, and an indistinct, broad line of similar pubescence along outer eye margins and extending to the postero-lateral angles, and the remainder of front, vertex and genae with sparse, black pubescence; mandibles edentate at the tip, with a small tooth within near the tip, and a large, obtuse tooth proximad of the smaller one; median area of clypeus with weak, small punctures; antennal tubercles prominent, angulate; scape closely punctate and clothed with sparse, pale pubescence; front, vertex and genae with moderate, dense, confluent punctures; postero-lateral angles angulate, but not produced and prominent; genal process very long, glabrous, distinctly longer than the second flagellar segment; hypostomal process large, strongly, transversely compressed, the tip attenuated into a small, acute tooth; distance between posterior eye margins and postero-lateral angles equal to approximately one and one-third times the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except the dorsal face of pronotum, mesonotum entirely, and nearly all of scutellum with sparse, black pubescence, the pale pubescence on the dorsum of propodeum dense, appressed and concealing the sculpture, that on the mesopleura appressed and erect, thicker than on the remaining pleural areas; dorsal face of pronotum with moderate, dense, confluent punctures; lateral margins of dorsal face of pronotum tuberculate medially; mesonotum with small, dense, confluent punctures; parapsidal furrows indistinct, almost obsolete; scutellum very strongly convex, with moderate, dense, confluent punctures; posterior face of propodeum distinctly reticulate, rounded into and continued on sides of propodeum; propleura with the anterior margin sharply carinate, micropunctate throughout, very faintly rugose dorsoventrally; broad, anterior and posterior margins of mesopleura micropunctate, the remainder with moderately large, dense, confluent punctures, the dorsal third distinctly elevated; metapleura micropunctate, except large, close punctures ventrally, and the dorsal third distinctly, longitudinally striate; sides of propodeum reticulate, the reticulations continued from the posterior face.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second; the first tergite with anterior and dorsal faces; anterior face of

first tergite with sparse, fine punctures and sparse, erect, pale hairs; dorsal face of first tergite clothed with dense, appressed, pale pubescence concealing the sculpture and sparse, erect, pale hairs; second tergite with small, distinct punctures on the anterior, median area, becoming close laterally and posteriorly and dense at the posterior margin; second tergite clothed with sparse, black pubescence, except the antero-lateral areas each with a triangular spot of dense, appressed, pale pubescence and sparse, erect, pale hairs, the apices of the pale spots contiguous at the anterior margin medially, the felt lines pale, the area between the felt lines and the lateral margins with a few, pale hairs, and a thin, inconspicuous, posterior marginal fringe pale, but broadly interrupted medially with black; tergites three to six with small, close punctures; lateral thirds of third tergite clothed with dense, appressed, pale pubescence and sparse, erect, pale hairs, the median third black pubescent; lateral fifths of fourth tergite with sparse, appressed, pale pubescence, and sparse, erect, pale hairs, the median three-fifths black pubescent; tergites five and six with a few pale hairs at the lateral margins, otherwise sparsely black pubescent; anterior area of last tergite with small, close punctures and sparse, black pubescence; pygidial area distinctly granulate; first sternite with sparse, pale pubescence, without a median, longitudinal carina; second sternite with sparse, small punctures, the latter becoming closer at the posterior margin, sparsely clothed with erect, pale hairs; sternites three to six with small, distinct, close punctures, the punctures on the anterior part of each sternite somewhat larger than those at the posterior margin, and each sternite clothed with sparse, erect, pale hairs; last sternite with small, very close punctures and sparse, erect, pale hairs.

Legs entirely black, clothed with sparse, erect, pale hairs; intermediate and posterior tibiae coarsely punctate above; calcaria black. — Length, 15 mm.

Holotype. — Male, Ost-Bolivien, March 1, 1907 (Steinbach), in Zoologisches Museum der Universität, Berlin.

This and the six following species have the genal process long and very well developed, distinctly longer than the second flagellar segment. This and the three following species have the vertex black pubescent, but *dentigula* and *protracta* differ from the other two in having the posterior marginal fringe of the second tergite pale. The hypostomal processes are much more strongly developed here than in the four preceding species; they are strongly elevated, transversely

compressed, broadly triangular in outline with the tips attenuated into a short, acute tooth, or in *protracta* into a slender spine.

*Hoplocrates protracta*, n. sp.

Male. — Head entirely black, clothed beneath with sparse, erect, pale pubescence, the clypeus and antennal scrobes with thick, pale pubescence, the genae with sparse, recumbent, pale pubescence, and the front and vertex entirely, including the area between the antennal tubercles and the area posterior to the eyes, with sparse, black pubescence; mandibles edentate at the tip, with a small tooth within near the tip, and a large, obtuse tooth proximad of the smaller one; median area of clypeus with close, confluent, shallow punctures; antennal tubercles strongly elevated, distinctly dentate; scape closely punctate and clothed with sparse, pale pubescence, except distally the pubescence fuscous to black; front and vertex with moderate, dense, confluent punctures, the genae with slightly larger, dense, confluent punctures; postero-lateral angles roundly angulate, but not produced and prominent; genal process long, sparsely punctate, distinctly longer than the first flagellar segment; hypostomal process large, the proximal two-thirds broad, transversely compressed, the distal third slender and spiniform, the total length greater than that of the genal process; distance between the posterior eye margins and the postero-lateral angles equal to approximately one and one-half times the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except the dorsal face of pronotum, mesonotum entirely, and nearly all of scutellum with sparse, black pubescence, the pale pubescence on the dorsum of propodeum dense, appressed and concealing the sculpture, that on the mesopleura appressed and erect and somewhat thicker than on the remaining pleural areas; dorsal face of pronotum and mesonotum entirely with moderately small, dense, confluent punctures; lateral margins of dorsal face of pronotum tuberculate medially; parapsidal furrows indistinct, almost obsolete; scutellum strongly, evenly convex, with moderate, dense, confluent punctures; posterior face of propodeum distinctly reticulate, rounded into and continued on sides of propodeum; propleura with the anterior margin sharply carinate, micropunctate throughout; broad, anterior and posterior margins of mesopleura micro-

punctate, the remainder with moderate, contiguous punctures, almost subreticulate, the dorsal third distinctly elevated; metapleura micropunctate, except moderate, contiguous punctures ventrally, and the dorsal third distinctly longitudinally striate; sides of propodeum rugoso-reticulate, the reticulations continued from the posterior face.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second, the first tergite with distinct anterior and dorsal faces; anterior face of first tergite glabrous, with only a few, small, weak punctures, clothed with sparse, erect, pale hairs; dorsal face of first tergite clothed with very dense, appressed, pale pubescence concealing the sculpture in addition to sparse, erect, pale hairs; second tergite with small punctures, close but slightly separated on anterior, median area of disk, becoming dense posteriorly and laterally; second tergite clothed with sparse, black pubescence, except as follows: a large, triangular spot of dense, appressed, pale pubescence on each antero-lateral area, the inner angles of each spot contiguous at the middle of the anterior margin of the tergite, a narrow, longitudinal area between each spot and the felt line, and the area between the pale felt line and lateral margins of tergite with sparse, pale hairs, and the posterior marginal fringe pale, except broadly interrupted medially and less broadly interrupted near the postero-lateral angles, with black; third tergite with a pair of strongly transverse, triangular spots of very dense, appressed, pale pubescence, the spots occupying most of the tergite, their apices directed mesad, but separated medially by a black pubescent area equal in width to one-fifth the width of the tergite; fourth tergite with a pair of much less conspicuous, lateral, transverse spots of thin, appressed, pale pubescence, the transverse width of each spot equal to about one-fourth the width of the tergite; fifth, sixth and last tergites clothed throughout with sparse, black pubescence, except the pygidial area on the last tergite bare, granulate and weakly rugose; first sternite sparsely, pale pubescent, almost impunctate, and without a median, longitudinal carina; second sternite with moderate, separated punctures, somewhat more separated on the disk than elsewhere, and clothed with very sparse, erect and appressed, pale hairs; sternites three to six with moderate, distinct, close punctures posteriorly, each with sparse, erect, pale hairs, and each with a thin, posterior

marginal fringe of pale hairs, except the fifth and sixth with the posterior marginal fringe in part black.

Legs entirely black, clothed throughout with sparse, erect, pale hairs; calcaria black. — Length, 16 mm.

Holotype. — Male, Los Canales, Naiguatá, Venezuela, July 23, 1939, 720 m. (G. Vivas-Berthier), in collection of University of Minnesota.

Similar in general appearance to *dentigula*, but differs in having the antennal tubercles strongly elevated and dentate, the area between the antennal tubercles as well as the front, entirely black pubescent, and the hypostomal processes much more strongly developed and with a different form. The attenuated tooth at the tip of the hypostomal process in *dentigula* is very short, while in *protracta*, the slender spine that terminates the process is one-half the length of the transverse proximal part.

This may possibly be the male of *pompalis* as two females of the latter species were collected at the same time and place as the above holotype, by Mr. G. Vivas-Berthier.

### *Hoplocrates decumata*, n. sp.

Male. — Head entirely black, clothed with sparse, black pubescence, except the head beneath with sparse, erect, pale hairs, the proximal two-thirds of mandibles with sparse, pale hairs, the clypeus and antennal scrobes with thicker, pale pubescence, and the proximal three-fourths of scape with sparse, pale hairs; mandibles edentate at the tip, with a small tooth within near the tip, and with a large, obtuse tooth within slightly proximad of the smaller one; median area of clypeus punctate; antennal tubercles angulate and prominent; scape closely punctate above; first segment of flagellum almost one and one-half times as long as the second; front, vertex and genae with moderately small, very close, somewhat confluent punctures; vertex with a very shallow groove extending from the posterior margin of eyes to the posterior margin of head; postero-lateral angles angulate but not produced nor prominent; genal process very long, distinctly longer than the second segment of flagellum, about equal in length to the first flagellar segment; hypostomal processes very large, prominent, transversely compressed, triangular in outline, strongly attenuated at the tip into a short, acute tooth; distance between the posterior eye margins and the postero-lateral angles equal to about one and one-fourth the greatest diameter of the eyes.

*Thorax entirely black, clothed with pale pubescence, except the dorsal face of pronotum, the mesonotum entirely and nearly all of scutellum clothed with sparse, black pubescence, the pale pubescence of the dorsum of propodeum dense and concealing the sculpture, that on the mesopleura somewhat thicker than elsewhere on the pleural areas; dorsal face of pronotum with moderate, dense, confluent punctures; lateral margins of dorsal face of pronotum distinctly tuberculate medially; mesonotum with moderately small, dense, confluent punctures; parapsidal furrows practically obsolete; scutellum strongly convex, with moderate, dense, confluent punctures; posterior face of propodeum reticulate, the reticulations extending on to the sides of propodeum; propleura with the anterior margin sharply carinate, micropunctate throughout and with a few, indistinct, shallow punctures; broad anterior and posterior margins of mesopleura micropunctate, the remainder with moderate, dense, somewhat confluent punctures, the dorsal third slightly elevated and somewhat more coarsely punctured than the ventral two-thirds; metapleura micropunctate, except ventrally closely punctate, and the dorsal third very weakly, longitudinally striate, sides of propodeum reticulate like the posterior face of propodeum.*

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second; first tergite with anterior and dorsal faces; anterior face of first tergite with sparse, fine punctures and sparse, erect, pale hairs; the dorsal face of first tergite clothed with dense, appressed, pale pubescence and sparse, erect, pale hairs concealing the sculpture; second tergite with small, distinct punctures on the anterior, median area, the punctures becoming very close laterally and posteriorly, and dense at the posterior margin; second tergite clothed with sparse, black pubescence, except the antero-lateral areas each with a triangular spot of dense, appressed, pale pubescence and sparse, erect, pale hairs, the apices of the triangles contiguous at the anterior margin medially, the felt lines pale, and a few pale hairs in the area between the felt lines and the lateral margins; posterior marginal fringe of second tergite entirely black; tergites three to six with small, close punctures; lateral thirds of third tergite with dense, appressed, pale pubescence and sparse, erect, pale hairs, the median third black pubescent; fourth tergite black pubescent, except a few, pale hairs laterally;

fifth and sixth tergites with sparse, black pubescence, except a few, pale hairs at the extreme lateral margins; anterior area of pygidial tergite with small, close punctures and sparse, black pubescence; pygidial area distinctly granulate; first sternite with sparse, pale pubescence, without a median, longitudinal carina; second sternite with sparse, small punctures, the latter somewhat less sparse laterally and posteriorly, clothed with sparse, erect, pale hairs; sternites three to six with small, distinct, close punctures posteriorly, and each clothed with sparse, erect, pale hairs, the fifth and sixth sternites also with a sparse, very inconspicuous, posterior marginal fringe of black hairs; last sternite with small, close punctures and sparse, black pubescence.

Legs entirely black, clothed with sparse, erect, pale hairs, except the intermediate and posterior tibiae above with sparse, black hairs; intermediate and posterior tibiae above coarsely punctate; calcaria black. - Length, 16 mm.

Holotype. - Male, Buenavista, near Santa Cruz, Bolivia, 1928 (J. Steinbach), in Cornell University, Ithaca, N. Y.

Paratype. - Male, same locality data as holotype [U. M.].

Related to *dentigula*. The hypostomal processes are higher, but of the same general form as in *dentigula*, and this species is more extensively black pubescent. *Decumata* has the front, vertex, genae, posterior marginal fringe of second tergite, fourth tergite almost entirely, excepting small, pale pubescent areas laterally, all black pubescent. This is probably the male of *monacha* (Gierstaeker)

*Hoplocrates nigricans*, n. sp.

Male. - Head entirely black, clothed with sparse, black pubescence, except the head beneath with sparse, erect, pale hairs, the proximal two-thirds of mandibles with sparse, pale hairs, the clypeus and antennal scrobes with sparse, pale hairs, and the scape with sparse, pale hairs on the proximal half, the distal half with black and pale hairs intermixed; mandibles edentate at the tip, with a small tooth within and a large, obtuse tooth proximad of the smaller one; median area of clypeus weakly punctate; antennal tubercles angulate and prominent; scape closely punctate above; first segment of flagellum one and one-half times as long as the second; front and vertex with dense, small, confluent punctures, the genae with very close, somewhat larger punctures; vertex with a shallow groove extending from the posterior eye margins to the post-



erior margin of head; postero-lateral angles angulate, but not produced nor prominent; genal process very long, longer than the second flagellar segment, about as long as the first flagellar segment; hypostomal processes very high, extending above the surface of the head as much as the genal teeth, transversely compressed, triangular in outline, acute at the tip, but only slightly attenuated; distance between posterior eye margins and postero-lateral angles of head almost equal to one and one-half the greatest diameter of the eyes.

Thorax entirely black, clothed with sparse, pale pubescence, except the dorsal face of pronotum, mesonotum entirely, and almost all of scutellum, black pubescent, the pale pubescence on the dorsal face of propodeum dense and concealing the sculpture; dorsal face of pronotum with very dense, small, confluent punctures; lateral margins of dorsal face of pronotum distinctly tuberculate medially; mesonotum with small, dense, confluent punctures; parapsidal furrows complete and distinct, but not conspicuous; scutellum strongly convex, with moderate, dense, confluent punctures; metanotum densely punctate; posterior face of propodeum reticulate, the reticulations extending on to the sides of propodeum; propleura with the anterior margin sharply carinate, micro-punctate throughout; broad, anterior and posterior margins of mesopleura micro-punctate, the remainder with moderate, close, confluent punctures, the dorsal third distinctly elevated and somewhat more coarsely punctate than the ventral two-thirds; metapleura micropunctate on median third, the ventral third confluent punctate, the dorsal third weakly longitudinally striate; sides of propodeum reticulate like the posterior face of propodeum, but tending towards longitudinally rugose at the anterior margin.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second, first tergite with anterior and dorsal faces; anterior face of first tergite with sparse, small punctures and sparse, erect, pale hairs; dorsal face of first tergite clothed with dense, appressed, pale pubescence and sparse, erect, pale hairs concealing the sculpture; second tergite with small, distinct punctures on the anterior median area, the punctures becoming very close laterally and posteriorly, and dense at the posterior margin; second tergite clothed with sparse, black pubescence, except the antero-lateral areas with a broad, lateral line of

sparse, appressed and erect, pale pubescence adjacent to the felt lines, the pale pubescence of the antero-lateral areas not contiguous at the anterior, median margin, but very widely separated; felt lines of second tergite pale and area between felt lines and lateral margins sparsely, pale pubescent; posterior marginal fringe of second tergite entirely black; tergites three to six with small, dense, somewhat confluent punctures, and each clothed with sparse, black pubescence, except each also with a few, pale hairs at the lateral margins; anterior area of last tergite with small, dense punctures and sparse, black pubescence; pygidial area distinctly granulate; first sternite with sparse, pale pubescence and without a median, longitudinal carina; second sternite with small, sparse punctures, the latter somewhat less sparse laterally and posteriorly, clothed throughout with sparse, erect, pale hairs; sternites three to six with small, close punctures posteriorly and each clothed with sparse, erect, pale hairs, except sternites three to five with a very thin, inconspicuous, posterior marginal fringe of black hairs, and the sixth with almost all the hairs fuscous instead of pale; last sternite with small, dense punctures and sparse, erect, fuscous hairs.

Legs entirely black, clothed with sparse, erect, pale hairs, except all the tibiae above with sparse, black hairs; intermediate and posterior tibiae densely punctate above; calcaria black. — Length, 16 mm.

Holotype. — Male, Jatahy, Goyaz, Brazil, in Muséum Nationale d'Histoire Naturelle, Paris.

Related to the preceding species, but the hypostomal processes are larger, and the body more extensively black pubescent. The hypostomal processes extend above the surface of the head fully as far as the genal process. This is the most extensively black pubescent species known to me in the *armatu* group, the front, vertex and genae, dorsal face of pronotum, mesonotum, scutellum, second abdominal tergite, except as noted above, and all the remaining tergites, except a few, pale hairs at the lateral margins, are entirely black pubescent, and the pale pubescent spots on the antero-lateral areas of second tergite are greatly reduced and widely separated on the anterior margin. In addition all the tibiae are black pubescent above, and the distal third of scape is in part black pubescent.

### *Hoplocrates cayennensis* Mickel

1937. *Hoplocrates cayennensis* Mickel, Rev. Ent. Rio, vol. 7, pp. 198-200, male.

Holotype. — Male, number 150.1, Cayenne (D. Rambur),

in Spinola collection, Museo Zoologia et Anatomia comparata della R. Università, Torino, Italy.

Only the unique type seen. This is the only male seen by me possessing a long, genal process, a pale pubescent vertex, and with the posterior marginal fringe of the second tergite black.

*Hoplocrates spinigula*, n. sp.

Male. — Head entirely black, clothed with pale pubescence throughout, the pubescence sparse and erect beneath, moderately thick on proximal two-thirds of mandibles, clypeus and antennal scrobes, sparse and subappressed on the front and most of the vertex, thick, appressed and erect on the extreme lateral areas of vertex and on the genae; mandibles edentate at the tip, with a small tooth within and with a large, obtuse tooth proximad of the smaller one; median area of clypeus punctate, but sculpture mostly concealed by pubescence; anterior margin of clypeus very deeply, roundly emarginate medially, thus bidentate; antennal tubercles angulate but only moderately prominent; scape closely punctate above, clothed with thick, pale pubescence; front, vertex and genae with moderate, close, confluent punctures, the latter somewhat shallower on the front and vertex than on the genae; postero-lateral angles angulate but not produced and prominent; genal process very long, distinctly longer than the first flagellar segment; hypostomal processes slender, spine-like, strongly recurved laterad, distinctly shorter than the genal process; distance between posterior eye margins and postero-lateral angles between one and one-third and one and one-half times the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except the mesonotum and most of scutellum with sparse, black pubescence, the pale pubescence on the dorsal face of pronotum sparse and erect, almost concealing a thin, posterior marginal fringe of black hairs, that on the propodeum dense, appressed, and sparse, erect, concealing the sculpture, that on the mesopleura thick, elsewhere sparse; dorsal face of pronotum with moderate, dense, confluent punctures, the latter stronger laterally than medially; mesonotum with moderately small, distinct, close punctures; parapsidal furrows present and complete, but not conspicuous; scutellum strongly convex, with moderate, dense, confluent punctures; metanotum densely punc-

tate; posterior face of propodeum reticulate, the reticulations extending on to the sides of propodeum; propleura with the anterior margin sharply carinate, micropunctate throughout, and with a few, small, weak punctures; mesopleura with the broad, anterior and posterior margins micropunctate, the remainder with moderate, shallow, close, somewhat confluent punctures, the dorsal third slightly elevated and somewhat more coarsely punctate than the ventral two-thirds; metapleura with the ventral third closely, moderately punctate, the median third micropunctate, and the dorsal third weakly, longitudinally rugose; sides of propodeum reticulate like the posterior face of propodeum.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with the second; first tergite with an anterior and dorsal face; anterior face of first tergite with sparse, small punctures, the latter becoming larger and closer towards the junction with the posterior face, clothed with sparse, erect, pale hairs; dorsal face of first tergite clothed with dense, appressed, and sparse, erect, pale pubescence concealing the sculpture; second tergite with small, sparse punctures on the anterior, median area, the punctures becoming close and somewhat confluent laterally and posteriorly, the posterior margin densely punctate; second tergite clothed with sparse, black pubescence, except the antero-lateral areas, each with a large, triangular spot of dense, appressed, and sparse, erect, pale pubescence, the apices of the triangles contiguous at the anterior, median margin, felt lines pale, area between felt lines and lateral margins with a few, erect, pale hairs, and a thin, posterior marginal fringe pale, but narrowly interrupted medially with a few, black hairs; tergites three to six with small, very close punctures; third tergite clothed throughout with dense, appressed, and sparse, erect pale pubescence, except narrowly subinterrupted medially, only the sparse, erect pubescence being present at the midline; fourth tergite clothed with pale pubescence, dense and appressed on the lateral thirds, becoming sparse towards the midline and obscurely interrupted medially by a few, black hairs; tergites five and six clothed with sparse, black pubescence, except the lateral margins of each with a few, pale hairs; anterior half of last tergite with small, very close punctures and sparse, erect, fuscous pubescence; pygidial area distinctly granulate; first sternite with sparse, pale pubescence and

without a median, longitudinal carina; second sternite with small, sparse punctures, the latter becoming close at the posterior margin, clothed with sparse, erect, pale hairs; sternites three to six with small, close punctures posteriorly and each clothed with sparse, erect, pale hairs, the sixth also with an inconspicuous, thin, posterior marginal fringe of black hairs; last sternite with small, dense punctures and sparse, erect, pale fuscous hairs.

Legs entirely black, clothed throughout with sparse, erect, pale hairs; intermediate and posterior tibiae strongly punctate above; calcaria black. — Length, 13 mm.

Holotype. — Male, Callanga, Peru, in Muséum Nationale d'Histoire Naturelle, Paris.

This species is easily recognized by the spiniform, recurved hypostomal processes. It is also more extensively pale pubescent than any of the preceding species, the pronotum being clothed with sparse, erect, pale hairs and the third abdominal tergite almost entirely, densely, pale pubescent, only a narrow line at the middle being sparsely, pale pubescent. The locality label reads «Callanga, Peru» but no such place in Peru is listed on any of the maps available to me.

*Hoplocrates ferocula*. n. sp.

Male. — Head entirely black, clothed throughout with pale pubescence, except a few, scattered, intermixed, pale fuscous hairs in the vicinity of the ocellar area, the pale pubescence sparse and erect beneath, moderately thick on proximal two-thirds of mandibles, clypeus and antennal scrobes, sparse and appressed on front, vertex and genae, except thicker along the outer eye margins and continued in a line to posterior margin of head; mandibles edentate at the tip, with a small tooth within near the tip and a large, obtuse tooth proximad of the smaller one; median area of clypeus very closely, shallowly punctate; antennal tubercles angulate, moderately prominent; scape very closely punctate above, clothed with pale pubescence; front, vertex and genae with moderate, very close, somewhat confluent punctures; postero-lateral angles angulate, but not produced and prominent; genal process very long, longer than the second flagellar segment, slightly recurved anteriorly; hypostomal processes longitudinally compressed, triangular in outline, very prominent, about two-thirds the length of the genal process and slightly recurved laterad; distance between posterior eye margins and postero-

lateral angles equal to one and one-fourth the greatest diameter of the eyes.

Thorax entirely black, clothed with pale pubescence, except posterior two-thirds of dorsal face of pronotum, mesonotum entirely and anterior half of scutellum with sparse, black pubescence, the pale pubescence sparse, except that on the dorsum of propodeum dense and concealing the sculpture, and that on the mesopleura thicker than elsewhere on the pleural areas; dorsal face of pronotum with moderate, dense, confluent punctures; mesonotum with small, very close punctures, except postero-laterally the punctures larger; parapsidal furrows complete and distinct; scutellum very strongly, evenly convex and with moderately large, dense, confluent punctures; metanotum densely punctate; posterior face of propodeum reticulate, the reticulations continued on to the sides of propodeum; propleura with the anterior margin sharply carinate, micropunctate throughout, and feebly rugose dorso-ventrally on the upper third; mesopleura with the broad, anterior and posterior margins micropunctate, the remainder with moderate, shallow, close punctures, the dorsal third somewhat elevated and more coarsely punctate than the ventral two-thirds; ventral third of mesopleura weakly rugoso-punctate, the median third micropunctate, and the dorsal third weakly rugose; sides of propodeum reticulate like the posterior face of propodeum.

Abdomen entirely black; first abdominal segment nodose, distinctly constricted at the junction with second, first tergite with anterior and dorsal faces; anterior face of first tergite with small, sparse punctures and sparse, erect, pale hairs; dorsal face of first tergite clothed with dense, appressed, and sparse, erect pale pubescence concealing the sculpture; second tergite with small, well separated punctures on the anterior, median, area, the punctures becoming very close laterally and posteriorly, and dense at the posterior margin; second tergite clothed with sparse, black pubescence, except the antero-lateral areas each with a large, triangular spot of dense, appressed, and sparse, erect, pale pubescence, the apices of the spots contiguous at the anterior, median margin, the felt lines pale, a few sparse, erect hairs on the area between the felt lines and the lateral margins, and the thin, posterior marginal fringe pale, except distinctly interrupted medially with black; tergites three to six with small, very close punctures; third tergite clothed with dense, appressed, and sparse, erect pale

pubescence, except medially with only the sparse, erect pubescence intermixed with a few, black hairs; tergite four with sparse, black pubescence, except the lateral fourths with sparse, erect, pale pubescence; tergites five and six clothed with sparse, black pubescence, except each with a few, pale hairs at the lateral margins; anterior area of last tergite with small, dense punctures and sparse, erect, fuscous pubescence; pygidial area distinctly granulate; first sternite clothed with sparse, pale pubescence, without a median, longitudinal carina; second sternite with very sparse, small punctures, the latter becoming close at the posterior margin, and clothed with sparse, erect, pale hairs; sternites three to six with small, close punctures posteriorly and clothed with sparse, erect, pale hairs; last sternite with very small, close punctures and sparse, erect, pale fuscous hairs.

Legs entirely black, clothed throughout with sparse, erect, pale hairs; intermediate and posterior tibiae coarsely punctate above; calcaria black. — Length, 15 mm.

Holotype. — Male, San Antonio, Colombia, in Muséum Nationale d'Histoire Naturelle, Paris.

Paratypes. — Male, San Antonio, Colombia [M. N. H. N.]; male, Santa Fé de Bogotá, Colombia [U. M.]; male, Rio Aguatal, Colombia [M. N. H. N.]; male, Bogotá, Colombia [M. N. H. N.]; three males, Colombia [M. N. H. N., U. S. N. M., Z. SS.].

Differs from the preceding species conspicuously in the triangular, longitudinally compressed, hypostomal processes which are strongly developed but not as long as the genal process. The pale pubescence in *ferocula* is almost as extensive as in *spinigula*, but is confined to the anterior portion of the dorsal face of pronotum, and the third abdominal tergite has only sparse, pale pubescence medially

### Geographical catalogue of species

#### Costa Rica

? *centromaculata* (Cresson). ♀

#### Colombia

*ferocula* n. sp. ♂.

*moneta* (Gerstaecker). ♀.

*pompalis* n. sp. ♀

*tartarina* n. sp. ♀.

*voluptuosa* (Gerstaecker). ♀.

#### Ecuador

*admiranda* n. sp. ♀.

*moneta* (Gerstaecker). ♀.

#### Venezuela

*centromaculata* (Cresson). ♀.

*penthesisilca* n. sp. ♀.

*pompalis* n. sp. ♀.

*protracta* n. sp. ♂.

Trinidad, B. W. I.

*pompalis* n. sp. ♀.

British Guiana

*centromaculata* (Cresson). ♀.

Surinam

*pompalis* n. sp. ♀.

French Guiana

*capitulata* n. sp. ♀

*cayennensis* Mickel. ♂.

*centromaculata* (Cresson). ♀

*elecebra* n. sp. ♀.

Brazil

*albifrons* n. sp. ♂

? *amoena* n. sp. ♀

*armata* (Klug). ♀

*bellica* n. sp. ♀.

*centromaculata* (Cresson). ♀

*cephalotes* (Swederus) ♀

*dryope* n. sp. ♀

*erythrasis* (Gerstaecker). ♂.

*lingulatus* n. sp. ♀.

*maculiceps* n. sp. ♀

*muculipennis* (Smith) ♂.

*miles* (Burmeister). ♀.

*miles* var. *atriceps* n. var. ♀.

*monacha* (Gerstaecker). ♀.

*munita* n. sp. ♀

*mystica* (Gerstaecker) ♂.

*nigricans* n. sp. ♂.

*oblectanea* n. sp. ♀.

*scutellaris* n. sp. ♂.

*smithi* (Cresson). ♀.

*specularis* (Gerstaecker). ♀.

*specularis* var. *subtilis* n. var. ♀.

*spiniceps* (Cresson). ♀.

Paraguay

*monacha* (Gerstaecker). ♀.

*specularis* (Gerstaecker). ♀.

*specularis* var. *subtilis* n. var. ♀.

Argentine Republic

*specularis* var. *subtilis* n. var. ♀.

Bolivia

*armata* (Klug). ♀.

*decumata* n. sp. ♂.

*dentigula* n. sp. ♂.

*gratiosa* n. sp. ♀.

*illex* n. sp. ♂.

*monacha* (Gerstaecker) ♀.

*monacha* var. *rubella* n. var. ♀.

*rufonotata* (André). ♀

Peru

*buccata* n. sp. ♂.

*centromaculata* (Cresson). ♀.

*moneta* (Gerstaecker). ♀.

*rufonotata* (André). ♀.

*spinigula* n. sp. ♂.

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## PEQUENAS COMUNICAÇÕES

**Attamyia Greene (1938) sinónimo de Myrmosicarius Borgmeier (1928)**  
(Dipt. Phoridae)

O dr. Ch. T. Greene (U. S. National Museum, Washington) teve a gentileza de me enviar, a meu pedido, um exemplar tipo de *Attamyia texana* Greene e *Apocephalus coecum* Greene, duas espécies mirmecófilas descritas em 1938 no trabalho intitulado «A new genus and two new species of the Dipterous family Phoridae» (Proc. U.S. Nat. Mus. vol. 85, 1938, pp. 181-185, 8 figs.).

A respeito de *Apocephalus coecum*, o dr. Greene me escreve (3.5.1941): «In a letter from Dr. H. Schmitz, Valkenburg, Lbg. Holland he has placed *Apocephalus coecum* in the genus *Cremersia*.» Examinei o paratipo recebido e posso confirmar a opinião de Schmitz.

Quanto à *Attamyia texana*, cujos tipos são provenientes de Provençal, La., U.S.A. e foram apanhados sobre *Atta texana* Buckley, posso adiantar o seguinte: A espécie, como sempre suspeitei, pertence ao gênero *Myrmosicarius* Borgmeier, 1928, de que fiz uma revisão em 1931 (Arch. Inst. Biol. S. Paulo, vol. 4, pp. 219-225, pls. 21-25). A terceira nervura é forquilhada; a forquilha é muita estreita, o que explica o engano de Greene que diz: «Third vein not forked at tip». As patas são exatamente formadas como em *Myrmosicarius*. O tarso anterior é adelgado na parte apical e biarticulado, fato extraordinário e talvez único em toda a ordem dos Dípteros, o que passou despercebido a Greene. Também o tarso médio é adelgado na extremidade. *Myrmosicarius texanus* (Greene) é uma espécie extremamente próxima de *M. grandicornis* Borgm. (Brasil), mas de tamanho menor.

T. Borgmeier

### Dr. Frederic Wallace Edwards (1888-1940)

Em 15 de Novembro de 1940 faleceu em Londres o dr. F. W. Edwards, um dos maiores dipterólogos dos últimos tempos. Transcrevo aqui o seguinte esboço auto-biográfico, recebido em princípios de 1940 e escrito especialmente para a Revista de Entomologia:

«Born 28. November 1888 at Peterborough, England. Educated at Cambridge County School and Christs College, Cambridge. Appointed to British Museum (Natural History)

in November 1910; Deputy-Keeper in Department of Entomology in that Institution since 1937. Sc. D. (Cambridge), 1931. Elected Fellow of Royal Society, 1939. Fellow of Entomological Society of London (since 1911) and of Society for British Entomology. Corresponding or Honorary Foreign Member of Soc. pro Fauna et Flora Fennica, Soc. Pathol. Exot. Paris, Soc. Ent. Argentina, Acad. Chilena Ci. Nat. Has charge of part of the collection of Diptera in the British Museum, and has specialised in various families of the suborder Nematocera, having published about 300 papers and notes on the insects of this suborder. In 1926-7 undertook a collecting expedition to the Southern Andes, in company with Mrs. Edwards and Mr. and Mrs. R. C. Shannon; the expedition was jointly arranged by the British Museum and the Bacteriological Institute of Buenos Aires; the Diptera collected are being described in the Museum publication «Diptera of Patagonia and South Chile», now nearly completed. In 1934-5 undertook a collecting expedition to Ruwenzori and other mountains of East Africa. Married Florence Mary Williams in 1911 and has three daughters.»

### Carta recebida

Ch. P. Alexander (Amherst, Mass.): «I have just received the copy of Vol. 11, Fasc. 3 of the «Revista», concluding the Memorial Volume to Dr. Neiva. What a monumental work this volume 11 has turned out to be, with a vast fund of scientific data that will prove to be invaluable to all present and future workers on the insect fauna of the Neotropics. Many sincere congratulations on the completion of this master-piece.»

### Noticias diversas

Em 8 de outubro de 1940, faleceu nos Estados Unidos o dr. Gustavus August Eisen, da Academia Científica da Califórnia. Nascido em Stockholmo em 2 de agosto de 1847, estabeleceu-se nos Estados Unidos em 1887. Colecionou no Mexico e na América Central, e escreveu sobre a caprificação do figo.

Em 19 de novembro de 1940 morreu, na idade de 76 anos, o Prof. Charles William Woodworth, antigo catedrático de Entomologia da Universidade da Califórnia.

A senhorita Grace Adelbert Sandhouse, pertencente ao quadro técnico do «U. S. Bureau of Entomology and Plant Quarantine» (Washington), faleceu em 9 de novembro último, na idade de 44 anos. Era especialista na identificação de abelhas e vespas.

Em 5 de novembro de 1940 faleceu o dr. Otto Emil Plath, Professor de Biologia na Universidade de Boston, e conhecido por seus estudos sobre a biologia de *Bombus*.

O dr. Charles Wardell Stiles, por longos anos secretário da Comissão Internacional de Nomenclatura Zoológica, faleceu em 24 de Janeiro deste ano.

Em 25 de janeiro p.p. morreu Charles William Leng, notável coleopterólogo e diretor do «Public Museum of Staten Island», New York.

Em 5 de fevereiro deste ano faleceu o coleopterólogo Samuel Henshaw, ex-diretor do Museo de Zoologia Comparada de Cambridge, Mass.

Hermann Schwarz faleceu repentinamente em Webster Groves, Missouri, em 21 de março do corrente ano. Nasceu em Osnabrück, Alemanha, em 27 de março de 1876, e veio para os Estados Unidos na idade de 9 anos. Foi o mais novo de 4 irmãos, todos naturalistas.

O «Instituto Agrônômico» de Campinas (S. Paulo), ao invés de publicações periódicas, passou a editar um boletim técnico mensal, intitulado «Bragantia», no qual serão divulgados todos os seus trabalhos. Para essa nova publicação ficou estabelecido o processo de assinaturas anuais a 50\$000 rs., e venda avulsa à razão de 6\$000 rs. por número.

Postamtman i. R. M. P. Riedel died on March 27, 1941, following a long illness, at Frankfurt a. d. Oder, Germany. He was born on February 19, 1870 and was thus in his 72nd year. Riedel was a distinguished student of the Diptera, particularly of the Tipulidae, having published numerous papers on the Australian, Oriental, Ethiopian, Neotropical and western Palaearctic faunas. He is survived by his widow, Margarete Weidefeld Riedel, and a daughter, Gertrud Riedel Kloeckner. (Segundo comunicação do Prof. Ch. P. Alexander).

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por T. BORGMEIER

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## Notas entomológicas da Baía. VIII.

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(Com 31 figuras)

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## I. *Lasioderma serricorne* F., caruncho do pó de cera de licuri

Este pequeno Coleoptero é conhecidíssimo na Baía, como caruncho do fumo armazenado, chegando a diminuir por 50 %



o valor do fumo, que permanece nos depósitos da Baía pelo prazo de um ano.

Como os charutos na Baía são fabricados com a folha não expurgada, os ovos e larvas desse inseto frequentemente ficam enrolados com as folhas. Quando os charutos são encaixotados, os ovos e larvas continuam o desenvolvimento, transformando-se em adultos. Em muitas caixas, que demoram no comércio, os charutos inutilizam-se pelos furos, que o adulto abre para a saída e para atacar outros charutos. Fato idêntico ocorre com os cigarros, porém mais raro, devido ao trato mecânico do tabaco, esmagando ovos e larvas no parcelamento das folhas.

Podem-se avaliar os prejuízos, causados por este pequeno inseto ao fumo da Baía, por centenas de contos de réis anualmente.

A espécie é cosmopolita e universalmente conhecida como praga de fumo armazenado. Na América do Norte entrou na lista dos insetos nocivos às habitações, atacando produtos alimentícios, tais como a pimenta Cayena, gengibre, arroz, figos, plantas medicinais etc.

Verificamos na Baía que o inseto cria-se em diversas sementes oleosas do comércio.

Ultimamente a produção da cêra de licuri *Cocos coronata* Mart. tomou na Baía grande incremento. O preparo da cêra, depois da fase primitiva de fundição do pó da cêra nas fazendas produtoras, melhorou sensivelmente com a instalação na capital baiana de maquinário adequado, que garante ao produto a uniformidade dos tipos e controla as impurezas, conseguindo deste modo para a nova mercadoria melhores créditos nos centros consumidores.

Em consequência dessa transformação da indústria, chegam do interior do Estado para a Capital, muitos milhares de sacos de cêra em pó. Às vezes os sacos demoram na viagem ou nos depósitos.

Verificamos que esta mercadoria está sujeita ao estrago pelo caruncho *Lasioderma serricorne* Fabr.

O inseto é um pequeno coleoptero, medindo de dois a dois e meio mm. de comprimento, de côr ruiva, coberto com fina pubescência amarelada; quando em repouso, a cabeça fica escondida dentro da carapuça do protorax; antenas de 11 segmentos serrilhados, no que difere de *Sitodrepa panicea* L., espécie parecida, que tem aproximadamente os mesmos hábitos.

Como medida de defesa da cêra de licuri, é aconselhável

não guardar a cêra em pó em depósitos por mais de um a dois meses. Em caso contrário, para evitar os danos e a deterioração do pó, a mercadoria deve ser expurgada.

No edifício do Instituto de Cacão existe aparelhamento moderno e eficiente de expurgo de qualquer produto, atacado por bichos. Felizmente, tomaram-se as necessárias medidas para o aproveitamento desse custoso maquinário, facilitando-se assim ao comércio baiano expurgar seus cereais, fumo, frutas secas, etc. O mesmo aparelhamento servirá para o expurgo de pó de cêra.

No comércio baiano houve certa tendência de exportar a cêra em pó. Esta prática, economicamente prejudicial ao País, corre ainda o risco de elevados prejuízos devido ao caruncho. Na demora em viagens de pó ensacado, o caruncho, multiplicando-se nos sacos, inutiliza a mercadoria. Os sacos, infestados pelo bicho, serão impedidos no desembarque pelos Serviços de Defesa Sanitária Vegetal nos portos de destino.

E' conveniente que o Estado proíba a exportação da cêra de licuri em pó, pois assim, não só se garante trabalho ao operariado baiano, como se valorisa o produto e, afinal, evita-se a provavel depreciação pelo caruncho.

## II. Duas espécies novas de *Chalcodermus*

### 1) *Chalcodermus yvensi*, n. sp., praga dos feijões

Observamos essa nova praga no Campo Experimental de S. Ana, do Governo do Estado do Espírito Santo, nos arredores de Vitória.

Notamos que as plantações do feijão manteiga, cultivado para exploração das vagens, como legumes, se achavam grandemente prejudicadas por um fenômeno, ainda não observado na patologia de nossas culturas de leguminosas e desconhecido em outras partes do mundo. Encontravam-se as vagens, ainda bem nóvas, antes de formar sementes, cortadas por uma incisão circular em ródá do legume, perto do pedúnculo, ou no meio, ou, mesmo, perto da ponta. A parte da vagem, assim decepada, logo cáe ao chão ou continúa pendente por alguns dias, porém, não acompanha o crescimento da parte basal sadia, não prejudicada. Com poucos dias murcha, e, finalmente, cáe na terra ao fim de 2-3 dias.

Investigando o caso, descobrimos que, em cada vagem, na parte decepada, existe um furinho microscópico e nêle, dentro

da parede do legume, se acha introduzido um ovo. Em outras vagens recortadas achamos dois e três ovos, postos distantemente um do outro. Colhemos as vagens podadas e conservamo-las em vidro, com terra no fundo. Dos ovos nasceram larvas, que se desenvolveram, roendo as paredes da vagem e embriões de sementes. Completando o crescimento no prazo de uma semana, as larvas abandonam as vagens e afundam-se na terra, onde se transformam em ninfas e adultos, surgindo estes, para atacar novas vagens. O ciclo evolutivo completo exige de 20 a 23 dias.

Estudando o inseto adulto, verificamos que pertence à grande família de Curculionídeos, subfamília de Cryptorrhynchíneos, gênero *Chalcodermus*.

O gênero é americano; conta, presentemente, cerca de 40 espécies, distribuídas desde a América do Norte até à Argentina. No Brasil registrou-se uma dezena de espécies. Várias dessas espécies foram estudadas pelo autor, tais como *Chalcodermus bondari* Marshall, podador de algodão, *Chalcodermus marshalli* Bondar e *Chalcodermus camposi* Bondar, podadores de cacão.

Nas vagens do feijão estudamos há anos a biologia de *Chalcodermus angulicollis* Fars., que introduz ovos nas sementes já desenvolvidas de vários feijões, atravessando com o ovopositor a parede das vagens já meio maduras. Essa espécie foi, posteriormente, denunciada como séria praga dos feijões no Estado do Rio. Observamo-la também no Estado do Espírito Santo, onde está generalizada nas hortas, destruindo carços do feijão manteiga. Caracteriza-se *Chalcodermus angulicollis* pelos ângulos laterais no protorax. Um outro caráter distintivo é o protorax liso no dorso, pontilhado com pequenas covinhas, intervaladas mais de três vezes do diâmetro das covinhas. Além disso, não faz incisões nas vagens.

A espécie que criamos, tem os lados do protorax arredondados, o dorso do pronoto enrugado e escavado de covas grossas. O tamanho é sensivelmente menor, atingindo apenas a 4,5 mm. de compr. sobre cerca de 2 mm. de maior largura nos élitros. A coloração nas duas espécies é a mesma: preto-uniforme-luzente.

Consideramos a espécie nova e denominamo-la *Chalcodermus yvensi*, em homenagem ao nosso amigo, Dr. Yvens Freitas de Souza, como lembrança do proveitoso tempo que passamos no Estado do Espírito Santo.

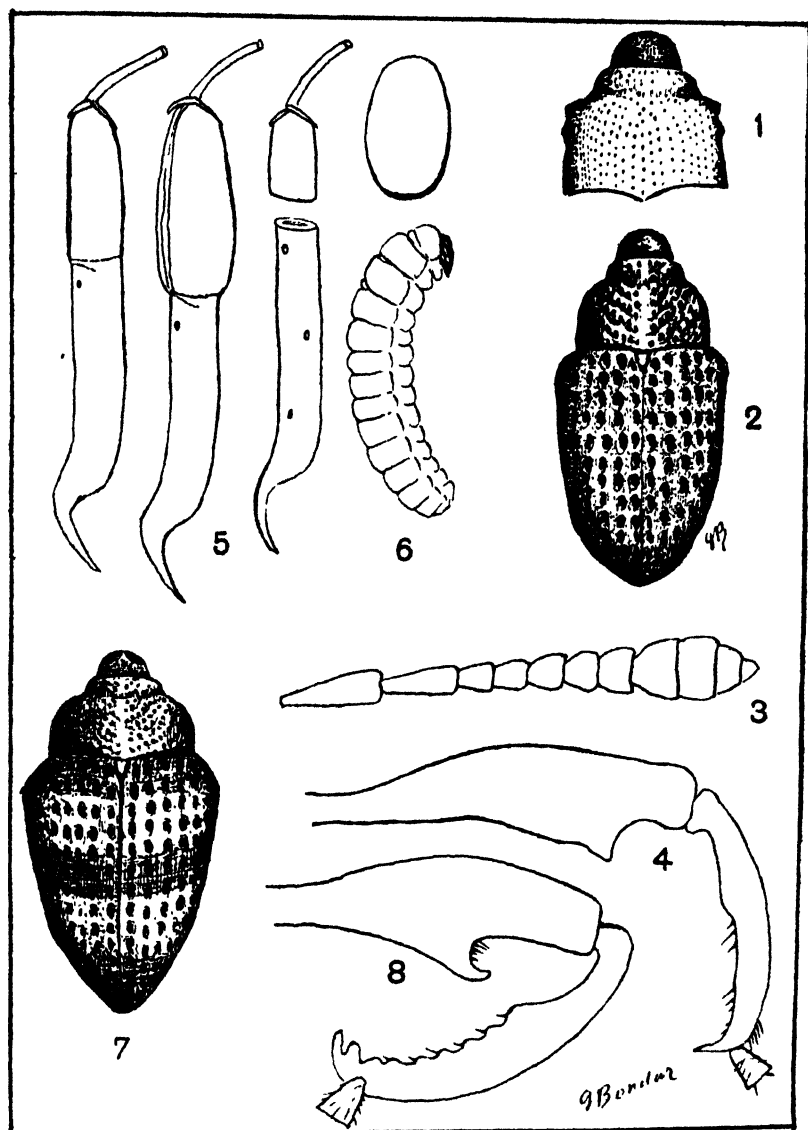


Fig. 1. *Chalcodermus angulicollis* Fars., protorax. -- Fig. 2. *Chalcodermus yvensi* n. sp., antena. -- Fig. 3. *Idem*, antena. -- Fig. 4. *Idem*, pata anterior. -- Fig. 5. Estragos causados por *Ch. yvensi* em vagens de feijão; aspectos diversos da podação e pontos de desova. -- Fig. 6. *Ch. yvensi* n. sp., ovo e larva. -- Fig. 7. *Chalcodermus canavialis* n. sp. -- Fig. 8. *Idem*, pata anterior. (Bonifaz del.).

Tanto *Chalcodermus angulicollis*, como *Ch. yvensi* devem criar-se em leguminosas nativas da nossa flórea, das quais passam aos feijões cultivados. Essas plantas ainda são desconhecidas. Julgamos que a primeira espécie está propagada em todo o Brasil, causando danos, principalmente nas hortas,

nas vagens do feijão manteiga. Numerosas hortas, que percorremos na Baía e em Vitória, são infestadas pelo *Chalcodermus angulicollis*. Encontramos a nova espécie apenas em uma horta em Vitória. Não deu resultado nossa procura persistente nos feijões em várias outras roças. E' de supor que a praga esteja ainda pouco disseminada. Na horta onde observamos o inseto, os prejuizos causados são grandes: de 50 a 80 por cento das vagens nascidas encontravam-se abortadas no chão, de modo que poucas escapavam. O inseto tem o ciclo evolutivo curto; no mesmo pé de feijão, pôde criar várias gerações.

A entomologia econômica deve anotar a nova espécie como praga potencial e tomar medidas apropriadas para evitar sua disseminação pelo território brasileiro.

Meios de defeza. — Conhecendo a biologia da nova praga, é facil debelá-la. Nas hortas, onde o inseto se manifestar, basta colher e destruir pelo fogo, ou pelos porcos, as vagens podadas, impedindo assim o desenvolvimento de ovos e larvas que se acham nas vagens.

Descrição. — Uniforme preto, glabro, lucente; compr. até 4,5 mm., maior largura, nos ombros, 2 mm. Cabeça globosa, com pontos finos esparsos; olhos grandes, arredondados, situados em baixo, distanciados na frente; rostr. vertical, grosso, cilíndrico, curvo, glabro, pontilhado-rugoso, carenas pouco pronunciadas. Antenas postmedianas; funículo com o segmento basal grosso, mais longo do que o segundo; 3-7 subiguais em comprimento, progressivamente mais largos, pilosos; clava ovoid, de 4 segmentos.

Protorax mais largo do que longo, pouco sinuoso na base; lados arredondados, concavos no colo no terço dianteiro; dorso cavernoso com covinhas heterogêneas fortes, em fileiras curvas, formando esboço de rugas, obliquamente divergentes para a frente; linha mediana lisa, irregular.

Élitros com os ombros apagados, muito mais largos do que o protorax, estreitando-se para trás; ápices em conjunto amplamente arredondados; os élitros envolvem o corpo dos lados; dorso com covinhas fortes, alinhadas, distantes nas carreiras, mais próximas lateralmente.

Patas glabras; femures nos três pares dilatados, unidentados; tíbias arqueadas, nas dianteiras 6-7 espinhos fortes na face interna; no ápice um tufo de espinhos menores juntos e esporão forte; tíbias traseiras com tufo de espinhos e esporão torcido lateralmente; os três tarsos basais subiguais em comprimento, fino-pilosos, o quarto glabro, pouco mais comprido; unha simples, forte.

Descrito sobre 45 exemplares, criados pelo autor de vagens «podadas» de feijão manteiga (*Phaseolus vulgaris*), sendo o ciclo evolutivo de 20-23 dias.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago. Material colhido em 9-6-1941 nos arredores de Vitória, Est. do Espírito Santo.

Difere das demais espécies pelos caracteres morfológicos e pela biologia.

2) *Chalcodermus canavaliae*, n. sp.

Corpo preto, glabro, luzente; élitros atravessados por duas faixas largas, irregulares, vermelho-escuras.

Cabeça globósa, pontilhada, olhos grandes, contíguos na frente, mais separados na direção do rostro; rostro grosso, recurvado, carenado-rugoso. Antenas subapicais; escapo glabro, pouco recurvado, clavado; funículo com o primeiro segmento longo e grosso, o segundo com cerca de dois terços do primeiro; 3-7 curtos, de comprimento subigual à largura; clava de 4 segmentos nítidos.

Protorax transversal, base bisinuosa; lados arredondados nos dois terços basais, côncavos no colo pronunciado; dorso pontilhado-rugoso; rugas irregulares, arqueadas, divergentes para a frente; linha mediana lisa.

Élitros mais largos do que o protorax, angulosos nos ombros descidos, estreitando-se fortemente para trás; ápices separadamente longo-arredondados; dorso fortemente pontilhado; manchas transversais vermelho-escuras sobre fundo preto, abrangendo as margens dos élitros.

Femures dilatados, com dente forte, recurvado, perto do meio; tíbias estriadas longitudinalmente, arqueadas, dilatadas, internamente obtuso-denteadas nos dois terços apicais, com cerda forte em cada dente; um gancho duplo no ápice; tarsos curtos, pilosos, unha pequena.

Compr. de cabeça, protorax e élitros 4 mm, largura nos ombros 2,5 mm

Descrito sobre 2 exemplares, apanhados pelo autor em *Caravalia obtusifolia*, Legum., nos arredores da Baía

Tipo e paratipo na coleção do autor.

Difere das demais espécies pelo colorido dos élitros e caracteres das patas.

### III. Sinopse biológica de alguns Curculionideos Cryptorrhynchineos

Os ilustres naturalistas estrangeiros, que percorreram o Brasil nos dois últimos séculos, para a coleta de representantes de nossa fauna entomológica, não tiveram a possibilidade de estabelecer dados sobre o modo de vida de nossos insetos.

No agrupamento em famílias e gêneros, os taxonomistas dos velhos centros de ciências naturais: Paris, Londres, Berlim, Petersburgo etc., orientaram-se apenas pelos caracteres morfológicos. Nos catálogos entomológicos atuais, são raríssimas as referências à biologia das nossas espécies.

Na classificação dos nossos Curculionídeos em subfamílias, tribus e gêneros os taxonomistas se basearam apenas nos caracteres externos das espécies, sem conhecer a sua biologia.

E' interessante notar que os agrupamentos morfológicos correspondem aos grupos biológicos.

Nossa prática pessoal de cerca de trinta anos de investigação dos insetos do Brasil, em conexão com a entomologia aplicada à agricultura, habilitou-nos a completar a obra dos taxonomistas com as observações biológicas em diversos grupos de insetos nocivos às plantas, inclusive vários gêneros de Curculionídeos. Julgamos essas observações de interesse científico e prático.

Para os taxonomistas os dados biológicos poderão ajudar na colocação genérica de espécies duvidosas, que se acham nos limites entre dois ou mais gêneros. Possuimos em nossas coleções várias espécies novas de Curculionídeos, que diversos taxonomistas da Europa, especialistas nessa família, incluem em gêneros diferentes. O conhecimento da biologia permitirá evitar essa vacilação.

Para os entomólogos práticos e para os novatos nessa ciência, os dados biológicos facilitarão a colocação genérica de espécies e o conhecimento prévio do provavel ciclo evolutivo. Em muitos casos, o conhecimento da espécie ou do gênero do inseto, facilitará a identificação da planta hospedeira, isto é o reconhecimento da família, gênero ou mesmo da espécie botânica.

As generalizações biológicas, que ora apresentamos, abrangem apenas uma dezena de gêneros de Cryptorrhynchíneos. Em nossos trabalhos anteriores sobre Prionomeríneos, Attelabíneos; Erirrhíneos etc. referimo-nos ligeiramente a esses agrupamentos biológicos, sem salientar todavia a sua importância.

No que diz respeito aos Cryptorrhynchíneos em geral, as espécies que conhecemos, sem nenhuma exceção, criam-se em plantas Phanerogâmicas Dicotiledôneas. Nenhuma espécie conhecemos proveniente de Monocotiledôneas.

#### 1) Gênero *Conotrachelus* Schönh. 1837

Gênero americano, não se encontrando seus representantes em outros continentes. O «Coleopterorum Catalogus» de W. Junk, Parte 151, por A. Hustache: Curculionidae, Cryptorrhynchinae, 1936, inclui no gênero 532 espécies, distribuídas desde a América do Norte até a Argentina. Do Brasil estão registradas 73 espécies. A revisão posterior do gênero por Fiedler registra mais de 600 espécies, das quais cerca de uma dezena de espécies baianas novas, por nós criadas em fru-

tos de várias plantas. Na Revista de Entomologia vol. 11, fasc. 3, 1940, Guy A. K. Marshall descreveu mais 14 espécies, das quais 13 providas da Baía, criadas por nós.

Posuímos em nossas coleções 46 espécies identificadas, das quais 36 baianas cuja biologia conhecemos, e temos mais de uma dezena não classificadas, seguramente novas.

Podemos, portanto, fazer a síntese das observações sobre o desenvolvimento desse gênero.

1) Todos os *Conotrachelus* desenvolvem-se em tecidos vivos de plantas e afetam a economia humana nas plantas de interesse econômico.

2) Criam-se somente em plantas Dicotiledôneas, não afetando outros grupos botânicos.

3) Desenvolvem-se nos frutos, alimentando-se as larvas das sementes, completando o ciclo evolutivo na terra. Conhecemos duas exceções: *Conotrachelus phaseoli* Mrsh., descoberto por nós, cria-se nas raízes de *Phaseolus vulgaris*, constituindo séria praga da cultura do feijão; e *Conotrachelus bondari* Mrsh. cria-se nos ramos e troncos da pinha *Anona squamosa*, alimentando-se a larva do tecido liberiano.

4) O período evolutivo depende do alimento disponível. Plantas, que frutificam uma vez por ano, hospedam espécies de *Conotrachelus* de ciclo evolutivo anual, passando as larvas e ninfas cerca de 9-10 meses no solo, emergindo os adultos nos meses de frutificação. *Conotrachelus phaseoli*, que sempre tem pronto o ambiente em que se cria, possui a evolução rápida, exigindo cerca de um mes de ovo ao adulto.

5) As espécies de *Conotrachelus* são estritamente limitadas a determinadas espécies, gêneros ou famílias botânicas. Há espécies de plantas que possuem dois *Conotrachelus* e raramente a mesma espécie de inseto encontra-se em gêneros botânicos diferentes. Muitos são restritos à uma única espécie de planta.

6) O Brasil deve possuir várias centenas de espécies desse gênero. Si até a presente data não entraram elas nas coleções, é devido ao modo oculto de vida do inseto, não se encontrando, ou mui raramente, os adultos em liberdade. O único modo seguro de obter essas espécies, consiste em criar as larvas dos frutos.

7) As famílias botânicas que mais contribuem para o número de espécies de *Conotrachelus* são: Sapotáceas, Myrtáceas, Leguminosas, Rosáceas, Guttíferas, Sapindáceas etc., de preferência as espécies de frutos volumosos e carnosos. Nenhuma espécie conhecemos vivendo em Euphorbiáceas e Moráceas, onde *Conotrachelus* é substituído por outros gêneros de Curculionídeos. Conhecemos apenas uma espécie vivendo em Solanáceas.

**Plantas hospedeiras.** — Mencionaremos aqui as plantas hospedeiras de espécies de *Conotrachelus*, ainda não mencionadas no «Terceiro Catálogo de Insetos que vivem nas plantas do Brasil» por A. de Costa Lima (Rio, 1936).



Salvo contraindicação, as espécies abaixo enumeradas foram todas criadas em frutos, sendo que de grande parte delas, nunca encontramos adultos em liberdade durante a nossa prática entomológica de 30 anos.

A totalidade provem de Água Preta, município de Ilheus, Estado da Baía.

Devemos as identificações botânicas à gentileza do Prof. F. C. Hoehne, Chefe do Departamento de Botânica de S. Paulo, a quem expressamos nossa gratidão. A identificação do nosso material de *Conotrachelus* devemos especialmente ao Sir Guy A. K. Marshall, Diretor do Imperial Institute of Entomology, London.

*Conotrachelus abdominalis* Fhs. Apanham-se os adultos em liberdade no cacoeiro. E' desconhecida a planta hospedeira.

*Conotrachelus albidus* Mrsh. Cria-se em frutos de «bilreiro» (*Gua-rea rosea*, Meliácea).

*Conotrachelus albiceps* Mrsh. Cria-se em frutos de «camborá branco» (*L'alsia* sp., Sapindacea).

*Conotrachelus alborufus* Fiedl. Adultos apanham-se em «capeba», Piperácea.

*Conotrachelus bacumuchae* Marsh. Cria-se em frutos de «bacumucha», Sapotácea.

*Conotrachelus camelus* Fiedl. Cria-se em sementes de «oití boi», *Couepia* sp., Rosácea

*Conotrachelus coerulescens* Fiedl. Cria-se em frutos de *Cassearia* sp., Flacourtiácea

*Conotrachelus costirostris* Boh. Apanha-se em cacoeiro; biologia desconhecida; cria-se provavelmente em *Inga* sp.

*Conotrachelus curvicastratus* Mrsh. Cria-se em vagens de *Inga* sp., Leguminosa.

*Conotrachelus deceptor* Mrsh. Cria-se em frutos de «castanha de caboclo», não identificada.

*Conotrachelus geminatus* Fiedl. Cria-se em frutos de *Inga quadrangularis*, Leguminosa.

*Conotrachelus inconcinus* Boh. Cria-se em *Inga* sp.

*Conotrachelus incertus* Fiedl. Cria-se em *Inga* sp.

*Conotrachelus leucophrys* Mrsh. Cria-se em frutos de «bacupari verdadeiro», *Rheedia floribunda*, Guttifera.

*Conotrachelus loripes* Boh. Cria-se em frutos de «inga caixão», *Inga nuda*, Leguminosa.

*Conotrachelus marmoreus* Mrsh. Cria-se em caroços de «oití boi», *Couepia* sp., Rosácea.

*Conotrachelus magnifasciatus* Fiedl. Cria-se em frutos de «araçá branco do mato», Myrtácea.

*Conotrachelus nitidiceps* Fiedl. Cria-se em vagens de «inga branco», *Inga* sp., Leguminosa.

*Conotrachelus persimilis* Fiedl. Cria-se em vagens de «inga cipó», *Inga edulis*.

- Conotrachelus praecanus* Fiedl. Apanha-se o adulto no cacoeiro.
- Conotrachelus praeustus* Boh. Cria-se em vagens de «manga brava», *Schwartzia macrostachya*, Leguminosa.
- Conotrachelus quadrinotatus* Fhs. Cria-se em vagens de «inga cipó», *Inga edulis*, Leguminosa.
- Conotrachelus rubicundulus* Boh. Cria-se em frutos de «carapicho» *Triumpheta bogotensis*, Tiliácea.
- Conotrachelus semicalvus* Mrsh. Cria-se em frutos de «murtaiba», Myrtácea
- Conotrachelus scutatus* Mrsh. Cria-se em frutos de «murta casca grossa», *Stephanopodium blanchetianum*, Dechapetalácea.
- Conotrachelus sloaneae* Mrsh. Cria-se em frutos de «jindiba» *Sloanea obtusifolia*, Elaeocarpacea.
- Conotrachelus squamosus* Cham. Cria-se em frutos de «capianga», *Vismia baccifera*, Guttifera.
- Conotrachelus stenomus* Mrsh. Cria-se em frutos de «murtaiba», Myrtácea.
- Conotrachelus subfasciatus* Boh. Cria-se em frutos de «giló» *Solanum racemiflorum*, Solanácea.
- Conotrachelus subnotatus* Mrsh. Cria-se em «fruto de macaco», Sapotácea.
- Conotrachelus subsequens* Fiedl. Biologia desconhecida
- Conotrachelus uncipectus* Mrsh. Cria-se em frutos de «jaboticaba de caboclo», *Pradosia lactescens*, Sapotácea

Ultimamente, E. Voss (Berlin-Dahlem) descreveu uma espécie nossa, que colocou no gênero *Phyrdenus*, devido aos tufos de escamas no protorax, e élitros sem cristas pronunciadas. Possuímos uma outra espécie, também de Myrtácea, com os mesmos característicos dos élitros, porém sem os tufos de escamas no protorax, que, sem nenhuma dúvida, deve ser considerada como *Conotrachelus*. Todos os representantes do gênero *Phyrdenus*, que conhecemos na Baía, desenvolvem-se em solanáceas. A nova espécie de Voss criamos em frutos de Myrtácea e julgamos sua posição mais acertada no gênero *Conotrachelus*. Passamos, portanto, a considera-la como:

*Conotrachelus pallidesignatus* (Voss). Cria-se em frutos de «araçá vermelho» *Psidium coriaceum*, Myrtácea.

## 2) Gênero *Chalcodermus* Schönh. 1837

Abrange um total de 38 espécies, todas americanas, conforme o catálogo de Hustache, 1936. O maior número de espécies conhecidas é da América Central. Para o Brasil são registradas 9 espécies. Possuímos em nossas coleções 13 espécies, algumas não identificadas. Julgamos que este gênero é bastante numeroso no Brasil e poder-se-á estudá-lo criando-se as larvas, pois os adultos raramente se apanham em liberdade.

No «Terceiro Catálogo de Insetos, que vivem nas Plantas do Brasil» de Costa Lima, mencionam-se apenas três es-

pécies, cuja biologia estudamos na Baía. Ultimamente observamos o desenvolvimento de quatro espécies novas e podemos apresentar a seguinte síntese biológica.

1) Todos os *Chalcodermus* desenvolvem-se em tecidos vivos de plantas Dicotiledôneas, principalmente em Bombáceas, Malváceas, Sterculiáceas, Tiliáceas, Leguminosas etc.

2) Um grupo desenvolve-se nas pontas novas de plantas, amortecidas com incisões circulares pelo bico da fêmea. São os «podadores». Outros desenvolvem-se em sementes novas nas vagens de Leguminosas.

Mencionaremos algumas espécies identificadas, que não entraram no «Terceiro Catálogo» de Costa Lima, e completamos observações sobre espécies já registradas.

*Chalcodermus angulicollis* Fahrs. A espécie está propagada também em todo o Estado do Espírito Santo, causando grandes prejuízos ao feijão manteiga.

*Chalcodermus marshalli* Bondar. Tem como planta natural de seva o «páu jangada», *Apeiba tibourbou*, Tiliacea. Cria-se também em Malváceas, Bombáceas e Sterculiáceas.

*Chalcodermus camposi* Bondar, 1940; cria-se em pontas de cacoeiro.

*Chalcodermus dentipennis* Fiedl. Cria-se em renovações de «angelim», *Andira pisonis*, Leguminosa.

*Chalcodermus yvensi* Bondar 1911, «podador» de vagens novas de feijão manteiga.

*Chalcodermus canavaliae* Bondar. Apanha-se em *Canavalia obtusifolia*, Legumin.

*Chalcodermus* sp. (N. 1419) Cria-se em vagens de *Acacia* sp., Leguminosa.

### 3) Gênero *Rhyssomatus* Schönh. 1837

Conforme o Catálogo de Hustache, abrange 67 espécies, todas do novo continente. Do Brasil são registradas apenas 7 espécies.

As larvas se desenvolvem em renovações ou hastes em pleno viço. Outras espécies desenvolvem-se em frutos de plantas Dicotiledôneas.

O «Terceiro Catálogo» de Costa Lima menciona apenas duas espécies, cuja biologia estudamos na Baía.

Há em nossas coleções 19 espécies, a maioria não descrita. Desenvolvem-se em frutos de Convolvuláceas, Asclepiadáceas e Leguminosas. Das espécies identificadas mencionaremos:

*Rhyssomatus polycoccus* Fhs., 1837; desenvolve-se em hastes vivas de *Wulffia stenoglossa*, Composta, fazendo incisões em roda da haste.

4) Gênero *Phymatophosus* Faust, 1896

Abrange apenas 4 espécies central e sul-americanas. No Brasil, o «Terceiro Catálogo» de Costa Lima, menciona 3 espécies, das quais uma *Ph. atropos* Boh., 1844, registrada no Catálogo de Hustache como *Coelosternus atropos*.

Todas desenvolvem-se em tecidos vivos de Cucurbitáceas, tanto nas hastes, como nos frutos ou sementes.

Às espécies mencionadas no Catálogo de Costa Lima, adicionamos as observações da Baía, onde criamos duas espécies.

*Phymatophosus scapularis* Champ. Cria-se em zoocedidias em hastes de *Cayaponia tayuya*, Cucurbitácea.

*Phymatophosus squameus* Fst., na mesma Cucurbitácea, encontrando-se também em hastes de abóbora.

5) Gênero *Phyrdenus* J. L. Lec. 1876

Gênero americano, com a distribuição nas três Américas. Abrange ao todo 8 espécies catalogadas, das quais 3 brasileiras. Pelo modo de vida é próximo ao *Conotrachelus*, desenvolve-se, porém, exclusivamente em Solanáceas, criando-se as larvas em frutos ou em hastes novas.

O Catálogo de Costa Lima registra uma espécie. Adicionamos mais duas, que criamos na Baía.

*Phyrdenus diversus* Boh. 1837. A larva desenvolve-se em rebentos novos de *Solanum paniculatum* Mart. ou «jurubeba».

*Phyrdenus muriceus* Germ. Cria-se em frutos de «giló alemão», *Solanum* sp., usado como hortaliça na Baía.

*Phyrdenus subnotatus* Boh., registrado no Catálogo de Hustache como *Cryptorrhynchus*. Cria-se em frutos de *Solanum paniculatum* e *S. racemosum*.

A nova espécie de Voss, *Ph. pallidesignatus*, que se cria em *Psidium coriaceum*, deve, ao nosso modo de ver, figurar no gênero *Conotrachelus*, como ponderámos acima.

6) Gênero *Eutinobotrus* Faust, 1896

Consta de três espécies do novo continente, nenhuma brasileira. Possuímos uma, não descrita, que se cria em raízes e hastes de Malváceas nativas, conhecidas como «vassorinha de relógio», do mesmo modo como *Gasterocercodes brasiliensis* Hambl. se cria em algodoeiro.

7) Gênero *Cryptacrus* Kirsch, 1869

Abrange 2 espécies da América Central e uma do Pará. Na Baía obtivemos uma delas, *C. atropos* Boh., criada em sementes de nhandiroba ou jandiroba, *Fevillea trilobata*, Cucurbitácea. E' provavel que outras espécies sejam próprias da mesma família botânica.

8) Gênero *Metriophyllus* Faust, 1896

Abrange 22 espécies da América do Sul. De nenhuma existem dados biológicos. No Brasil não foi registrado.

Possuimos uma espécie que ultimamente foi descrita por Voss como *Metriophyllus subplanatus* Voss. A larva desenvolve-se em vagens de *Cassia apoucouita*, Leguminosa, conhecida no sul baiano como «verga d'anta». Possuimos mais três espécies, não descritas. Duas delas desenvolvem-se em vagens de Leguminosas. A terceira é de biologia desconhecida. E' lógico supôr que todas as espécies deste gênero desenvolvem-se em vagens de Leguminosas, destruindo as sementes.

9) Gênero *Metoposoma* Faust, 1896

O Catálogo de Hustache abrange 6 espécies, das quais três da América Central e três brasileiras, inclusive duas descobertas por nós e que figuram no Terceiro Catálogo de Costa Lima.

Possuimos mais três espécies, não descritas. Todas, que conhecemos, desenvolvem-se em hastes vivas de Leguminosas. E' provavel que as espécies sejam numerosas nas matas brasileiras.

10) Gênero *Coelosternus* Schönh. 1826

O Catálogo de Hustache registra neste gênero 117 espécies, principalmente da América Meridional. Algumas são conhecidas do Japão e ilhas do Pacífico. No Brasil são registradas 33 espécies, inclusive 4 descobertas por nós na Baía. Possuimos mais 4 espécies, não descritas. Todas se desenvolvem em hastes de Euphorbiáceas. Julgamos que as espécies de biologia desconhecida, têm o mesmo regime.

11) Gênero *Coelosterninus* Champ. 1902

O gênero contém apenas uma espécie: *C. longipennis* Boh. 1837. A larva cria-se em hastes de «mata-pasto», *Cassia occidentalis*, Leguminosa.

12) Gênero *Rhinochenus* Lucas, 1857

Abrange 18 espécies, todas da América Meridional. Na Baía conhecemos duas, que entraram no Terceiro Catálogo de Costa Lima, com nossas observações biológicas. A respeito de uma delas, *Rh. stigma*, devemos adicionar que, além das vagens de *Hymenea* sp., cria-se também em vagens de «oleo copaiba», *Copaifera langsdorffii*, Leguminosa.

E' lógico supor que as outras espécies tenham o mesmo regime, criando-se em vagens de Leguminosas.

13) Gênero *Eubulus* Kirsch, 1869

Abrange 88 espécies, todas da América tropical. Do Brasil conhecem-se apenas 4 espécies, das quais uma descoberta por nós na Baía. Possuimos mais quatro espécies, não descritas.

As larvas se desenvolvem em haste de plantas de famílias diversas. Como este gênero não figura no Catálogo de Costa Lima, daremos informação sobre duas espécies.

*Eubulus fairmairci* Jek., identificado pelo Imperial Institute of Entomology, London e que não figura no Catálogo de Hustache. Desenvolve-se em troncos de *Inga* sp., Leguminosa.

*Eubulus virgatulus* Mrsh. 1933. Criamos em hastes de Acanthaceae, não identificada.

14) Gênero *Collabismus* Schönh. 1837

Possuimos uma espécie, *C. clitellae* Boh., cuja biologia estudamos e que entrou no Terceiro Catálogo de Costa Lima. Cria-se em hastes de Solanáceas. Julgamos que as quatro espécies conhecidas deste gênero criam-se em hastes de Solanáceas.

15) Gênero *Collabismodes* Champ. 1902

Abrange 9 espécies da América tropical; duas são brasileiras, inclusive uma descoberta por nós: *Collabismodes tabaci* Mrsh. Cria-se em hastes de Solanáceas.

## IV. Reagrupamento de alguns gêneros de Curculionídeos brasileiros

Lacordaire, na sua clássica obra «Histoire Naturelle des Insectes, Genera de Coleptères», tomos 6 e 7, elaborou a chave da subdivisão de Curculionídeos do mundo, baseando-se

no material escasso, existente naquele tempo. Essa chave de sufamílias, tribus e gêneros continua em vigor até hoje.

No momento interessam-nos os Curculionídeos de mandíbulas descobertas ou Phanerognatos, que Lacordaire subdivide em Synmerídeos, de coxas dianteiras contíguas e Apostasimerídeos, com coxas dianteiras distanciadas. Nos Synmerídeos entraram 25 subfamílias e nos Apostasimerídeos 15; delas várias subfamílias não possuem representantes no Brasil.

A subdivisão de Lacordaire foi respeitada pelos autores modernos, que publicaram diversos fascículos do «Coleopterorum Catalogus» de W. Junk: G. A. K. Marshall, A. Hustache, A. Klima, K. W. von Dalla Torre, E. Voss etc.

De algumas subfamílias de Lacordaire, descobrimos na Baía numerosas espécies novas e lhes estudamos a biologia. Apareceram novas formas morfológicas, que discordam da chave de Lacordaire. Assim, no gênero americano *Hoplorhinus*, que figura na subfamília Antliarrhininae, fazendo parte dos Apostasimerídeos, verificamos várias espécies com coxas contíguas, que contrariam a inclusão desse gênero no agrupamento de coxas afastadas. Já por outras razões Hustache pleiteou a remoção deste gênero para o agrupamento de Erirrhíneos, subfamília de coxas contíguas. Nossas observações confirmam a necessidade desse novo agrupamento.

Existem outras razões para esta modificação na posição sistemática do gênero. A subfamília Antliarrhininae entra na chave de Lacordaire na seção dos Apostasimerídeos com antenas rétas. Si isso é a regra para os gêneros africanos, o gênero americano *Hoplorhinus* constitue claramente excepção, pois em duas dezenas de espécies que possuímos, as antenas são geniculadas, contradizendo a chave referida.

Estamos, portanto, de acordo com Hustache, que o gênero *Hoplorhinus* deve figurar na subfamília de Erirrhíneos, ao lado de *Phytotribus*.

Outra modificação, que julgamos oportuno sugerir, é a respeito da subfamília Petalochilinae, que figura como independente no último Coleopterorum Catalogus de W. Junk, Parte 144, por K. W. von Dalla Torre e E. Voss, na subdivisão dos Synmerídeos, diferindo dos Erirrhíneos pelo pronoto separado dos flancos pelas arestas laterais.

A subfamília abrange três gêneros sulamericanos, consti-

tuidos, conforme o *Coleopterorum Catalogus*, de poucas espécies, na maioria brasileiras.

Na Baía aumentamos sensivelmente o número de espécies conhecidas e julgamos possível que o total do grupo pode atingir várias dezenas de espécies, quando os naturalistas brasileiros se derem ao trabalho de investigar a entomologia das nossas palmeiras.

Os gêneros desta subfamília: *Balanephagus* e *Petalochilus*, próximos entre si, possuem realmente flancos separados do dorso pelas arestas laterais. No gênero *Ancylorrhynchus* tal característico é duvidoso, ou não existe, sendo o protorax arredondado dos lados, como em *Hoplorhinus*. Uma espécie, que abaixo descrevemos, pelo protorax, poderá ser incluída em ambos esses gêneros.

Para clareza da nomenclatura e pelas afinidades, julgamos possível fundir num só os gêneros *Balanephagus* e *Petalochilus*.

A subfamília poderá ser anexada, sem prejuízo, aos Erirrhíneos, como tribu *Petalochilini*.

Pela configuração do corpo os *Ancylorrhynchus*, salvo o tamanho maior e as antenas com o funículo de 6 segmentos, aproximam-se de *Derelomus*.

Os Derelomíneos na obra de Lacordaire constituem uma subfamília à parte, na falange dos Apostasimerídeos. Devido a estudos posteriores, esse grupo foi removido para os Synmerídeos, entrando no último Catálogo de A. Klima, Curculionidae: Erirrhiniinae, nesta subfamília como tribu Derelomini.

Nos Derelomíneos existem formas de passagem, pouco diferindo de *Hoplorhinus* e *Phytotribus*.

E' mais uma razão para o reagrupamento destes Curculionídeos, reunindo na sistemática os gêneros *Phytotribus*, *Hoplorhinus*, *Ancylorrhynchus*, *Balanephagus*, *Petalochilus*, *Derelomus*, *Everges* etc. na atual subfamília Erirrhiniinae.

As considerações de ordem morfológica são confirmadas por dados biológicos: todos esses gêneros criam-se em inflorescências de palmeiras.

*Phytotribus*, *Hoplorhinus* e *Balanephagus* desenvolvem-se em espigas de palmeiras; raras vezes se criam em pedúnculos florais mortos.

Os *Derelomus* criam-se em flores masculinas de palmeiras comendo as anteras, completando o curto ciclo evolutivo, protegidos pelos pétalos.



Os *Ancylorrhynchus* apanham-se em flores de palmeiras do gênero *Cocos*, mas não existem dados exatos sobre o modo de vida.

Por essas razões, na descrição abaixo de novas espécies, incluímos esses gêneros na mesma subfamília.

#### V. Novos Eirrhineos brasileiros (Col. Curc.)

##### 1) Gênero *Phytotribus* Schönh. 1843

Este gênero, baseado no tipo *Ph. unicolor* Boh., de Caiena, tem como característicos essenciais: segmentos 1-2 do funículo longos, 3-8 curtos, turbinados; clava pequena, ovoide, acuminada; rostró alongado, fino, roliço, pouco arqueado; torax oblongo, subcônico, base bisinuada, pouco convexo; patas mediocres, par dianteiro mais longo; femures clavados, dentados; tíbias roliças, retas; ápice sem barba; tarsos longos, esponjosos em baixo etc.

As quatro espécies de Caiena, que constituem o gênero, conforme o *Coleopterorum Catalogus* de W. Junk, parte 140, 1934, Hustache adicionou mais três, fornecidos por nós, e que divergem da diagnose genérica. Em *Notas Entomológicas da Baía VII*, descrevemos mais duas espécies, que também divergem da diagnose genérica.

As discordâncias notam-se no tamanho relativo de segmentos do funículo, da clava, na conformação do bico, no característico do femur geralmente não armado de dente, no esporão das tíbias, etc.

Este exemplo concreto mostra que tanto os representantes de *Phytotribus*, como os de *Hoplorhinus*, são bastante variáveis e de tal modo que é difícil estabelecer a separação morfológica nítida entre os dois gêneros. São Curculionídeos primitivos, adaptados a viver na família botânica antiga das Palmáceas; os dois gêneros têm a mesma biologia, desenvolvendo-se as larvas em espigas de palmeiras, às vezes em sociedade, levando cerca de 4-5 meses para completar o ciclo evolutivo. Cada gênero ou espécie de palmeira possui suas próprias espécies de *Phytotribus* e *Hoplorhinus*; geralmente há diversas espécies entomológicas em uma espécie botânica, como veremos no caso de *Attalea compta* Mart., que sustenta mais de meia dúzia de espécies de *Hoplorhinus* e vários *Phytotribus*.

Em nossa distribuição das espécies novas, atribuímos ao *Hoplorhinus* espécies maiores, cabeça relativamente pequena,

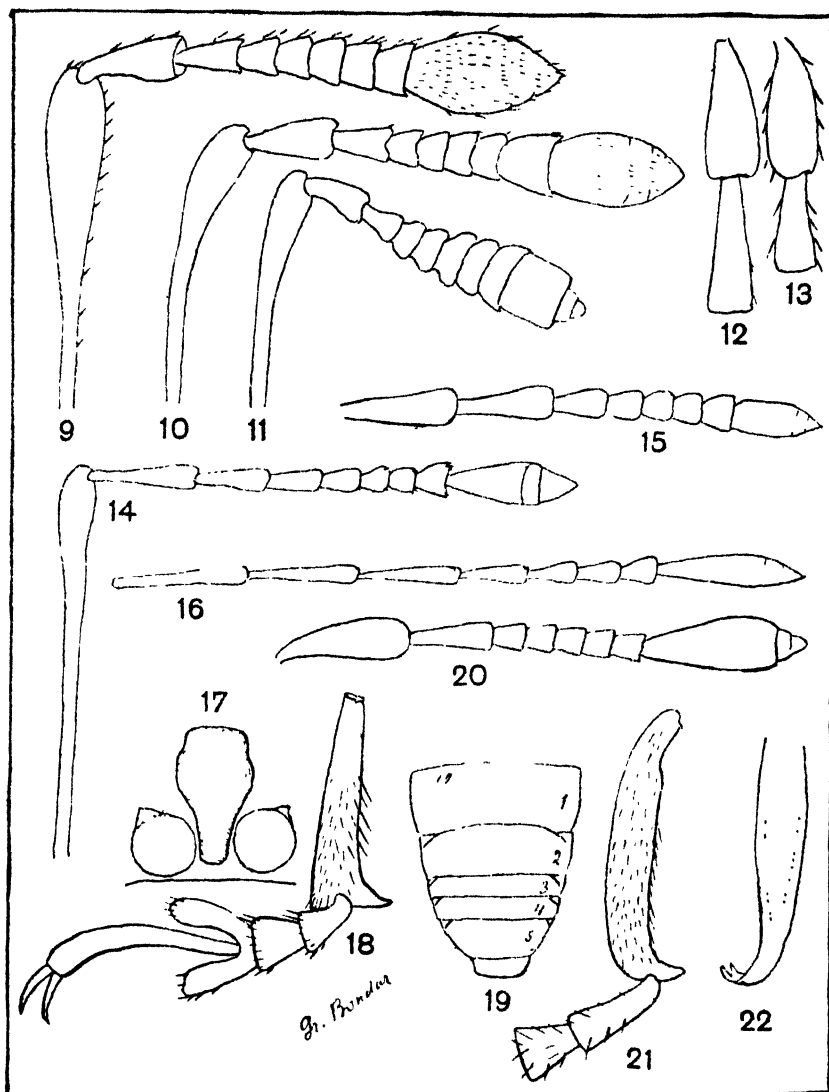


Fig. 9. *Phytotribus jiquiensis* n. sp., antena. — Fig. 10. *Ph. cocosae* Hust. n. sp., antena. — Fig. 11. *Ph. curtus* n. sp., antena — 12. *Ph. cocosae* Hust. n. sp., segmentos 1-2 do funículo da fêmea. — Fig. 13. *Ph. minor* n. sp., segmentos 1-2 do funículo da fêmea. — Fig. 14. *Hoplorhinus fontenellei* n. sp., antena. — Fig. 15. *Hoplorhinus capichaba* n. sp., funículo. — Fig. 16. *Hoplorhinus marisae* n. sp., funículo. — Fig. 17. *Derelomus elaeisae* Hust n. sp., lâmina prosternal intercoxal. — Fig. 18. *Idem*, tibia anterior do macho. — Fig. 19. *Idem*, segmentos do abdômen — Fig. 20. *Derelomus binotatus* n. sp., funículo. — Fig. 21. *Idem*, tibia anterior do macho. — Fig. 22. *Idem*, aparelho genital do macho. (Bondar del.).

rosto do macho geralmente com dentes nas carenas da face superior, sétimo segmento do funículo não fazendo parte da clava, antenas nos machos postmedianas, protorax frequentemente arredondado dos lados; patas nos dois sexos com fêmur armado de dente, tíbias pilosas no ápice, com ou sem esporão.

No gênero *Phytotribus* incluímos espécies pequenas, cilíndricas, cabeça grande; bico do macho sem dentes pronunciados e com antenas subapicais; sétimo segmento do funículo largo, formando a base da clava; femures nos dois sexos geralmente não armados de dente; tíbias sem pêlos fortes no ápice, providas de esporão; protorax geralmente da largura dos élitros.

Descrevendo novos *Hoplorhinus* do Perú e da Argentina em 1934, Hustache apontou a divergência da diagnose genérica.

Apontamos essa discordância também em *Phytotribus*.

De nossas espécies, Hustache descreveu duas na Revista de Entomologia (vol. 11, fasc. 3, 1940). A terceira, denominada pelo mesmo naturalista em carta que recebemos no início de 1940, não foi publicada, devido aos acontecimentos políticos posteriores. Como já por diversas vezes mencionamos essa espécie em nossos artigos, resolvemos descrevê-la, respeitando o nome dado pelo autor da mesma. Adicionamos três espécies, recém-colhidas.

a) *Phytotribus (Phytotribeilus) cocosae* Hustache, 1940. n. sp.

Amarelo uniforme claro, longo, cilíndrico, glabro; olhos pretos; patas esbranquiçadas, exceto as juntas que são ruivas; dimorfismo sexual pronunciado no rostro.

Machos. -- Cabeça lisa, grande, de um quarto mais estreita do que o protorax; olhos distantes; um pequeno sulco na fronte. Rostro subhorizontal, glabro, grosso, metade da largura da cabeça; cônico, mais curto do que o protorax, subreto, carenas pouco marcadas.

Antenas postmedianas; escapo longo; funículo com o primeiro segmento clavado, mais fino do que a clava do escapo, do comprimento dos dois ulteriores juntos; segmentos 3-7 progressivamente mais grossos, fazendo o sétimo a base da clava; segmento primeiro da clava mais longo do que os dois apicais.

Protorax mais longo do que largo, mais estreito na metade basal; colo pronunciado; pontilhado de covinhas circulares distantes, microscópicas.

Élitros cerca de quatro vezes mais compridos do que largos, mais longos do que o rostro, cabeça e protorax reunidos, pouco mais largos do que o protorax, estriados com carreiras de covinhas circulares; pilosidade finíssima, esparsa, linear, microscópica.

Patas com as coxas dianteiras ligeiramente afastadas; femures clavados, inermes, glabros; tíbias lineares, glabras; um esporão no ápice e uma carreira de pêlos finos, formando pente.

Comprimento total de 3 a 4 mm.

Fêmea de tamanho, forma e colorido subiguais aos do macho; rosto mais fino, longo, recurvado; antenas perto da base do rosto; escapo envergado, atingindo o meio do olho.

Descrito sobre 42 exemplares, dos quais a metade são machos, apanhados pelo autor em flores de «pati» (*Cocos botryophora* Mart.), na espata da qual o inseto se cria. Município de Nazaré, Baía.

Cotipos na coleção do autor, na de A. Hustache, no Museu Paulista, e no Field Museum of Natural History, Chicago.

A espécie se reconhece pelo corpo longo, cilíndrico, glabro, amarelo claro, forma do rosto e das antenas.

b) *Phytotribus minor*, n. sp.

Amarelo claro, longo, cilíndrico, glabro, olhos pretos; patas esbranquiçadas, exceto as juntas que são ruivas; dimorfismo sexual notável no rosto.

Proporções do corpo e caracteres morfológicos idênticos aos de *Ph. cocosae* Hust., porém o tamanho menor, antenas mais pilosas; na fêmea o segundo segmento do funículo mais curto do que o primeiro; élitros com o ápice mais estreitado, formando uma cunha obtusa; carreiras no dorso com covinhas menores.

Comprimento total até 3 mm.

Descrito sobre 14 exemplares, dos quais a metade são machos, apanhados pelo autor em 12/6.41 em flores de *Attalea compta* Mart.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

c) *Phytotribus curtus*, n. sp.

Pequeno, amarelo-acastanhado, glabro; élitros curtos, do comprimento da cabeça e protorax juntos; dimorfismo sexual manifesto no rosto.

Macho. — Cabeça grande, cerca da metade da largura do protorax; olhos pretos, pequenos, salientes, intervalo igual à largura do rosto; bico inclinado, largo, pouco recurvado, áspero lateralmente, no terço apical alargado.

Antenas no terço apical; escapo glabro; funículo glabro, curto, com a clava subigual ao comprimento do escapo; o primeiro segmento duas vezes mais longo do que largo; 3-7 sub-

guais em comprimento, progressivamente mais largos; o sétimo duas vezes mais largo do que longo, da largura da clava; clava com o primeiro segmento tubular; os dois terminais abruptamente estreitos e curtos, pilosidade fina.

Protorax subquadrado, margens ligeiramente arqueadas; colo pouco estreitado, pigmentado de castanho carregado; dorso moderadamente convexo, áspero pelas covinhas esparsas.

Élitros da largura do protorax, margens ligeiramente mais pigmentadas; há nove carreiras longitudinais de covinhas microscópicas circulares; nos intervalos há pilosidade espaçada, minúscula.

Patas glabras; coxas dianteiras separadas por um espaço igual ao seu diâmetro; femures fortemente alargados, inermes; tíbias grossas, retas, no ápice com esporão e pequenos espinhos.

Comprimento total 2,5 mm.

Fêmea difere pelo bico mais estreito e recurvado, bruscamente rebaixado perto da frente; antenas medianas, olhos dirigidos para a frente.

Descrito sobre 1 macho e 1 fêmea, apanhados pelo autor 12/6/41 em flores de *Attalea compta* Mart., no município de S. Mateus, Estado do Espírito Santo.

Tipo e paratipo na coleção do autor.

A espécie se caracteriza pelos élitros curtos, muito mais curtos que o bico e protorax juntos e pela forma das antenas

d) *Phytotribus jiquiensis*, n. sp.

Castanho-amarelado, uniforme-esparso-dourado-piloso, fôcco, subcilíndrico; dimorfismo sexual pouco pronunciado.

Macho. — Cabeça grande, globosa, avermelhada, lisa; olhos pretos, separados pela base larga e alta do rostro; rostro inclinado, grosso, largo, dilatado no ápice, subreto, curvo no quarto apical, esparso-dourado piloso; comprimento subigual ao do protorax, largura cerca de 4 vezes menor do que o comprimento; áspero lateralmente.

Antenas subapicais; escapo linear, piloso no lado externo, clavado, atingindo o olho; funículo esparso-piloso, primeiro segmento do comprimento dos dois ulteriores; 3-7 subiguais em comprimento, progressivamente mais largos; clava subovoidal, unida, denso-pilosa.

Protorax bisinuoso na base, pouco mais longo do que largo; lados arqueados, colo pouco marcado; pouco mais es-

treito do que os élitros; superfície áspera, fosca. Escudo minúsculo, cordiforme.

Élitros com os ombros arredondados, lados paralelos, dorso estriado; uma carreira de pêlos fortes nos intervalos e duas a três carreiras irregulares de sedas minúsculas nos sulcos; cerca de duas vezes mais longos do que largos.

Patas esparso-pilosas; coxas dianteiras subcontíguas; femures nos três pares muito grossos, inermes; tíbias lineares, um pequeno esporão no ápice e uma carreira de pêlos em forma de pente.

Derme em toda a extensão do corpo tessellada de pequenos alvéolos, uniformes, arredondados, microscópicos.

Comprimento total cerca de 5 mm., largura 1,3 mm. nos élitros.

Fêmea difere pelas antenas postmedianas e não subapicais, o bico ligeiramente mais curvado.

Descrito sobre 32 exemplares, sendo 3 fêmeas, pegados pelo autor em flores de «coco de vaqueiro» (*Cocos campestris* Mart.) em Jiqui, Estado da Baía em maio de 1941. Cria-se em espatas da mesma palmeira.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

A espécie se parece com *Phytotribus platyrhinus* Hustache, porém é menor e difere pelos caracteres do rosto, antenas, élitros etc.

## 2) Gênero *Hoplorhinus* Chevr. 1878<sup>1</sup>

Este gênero, até a presente data, abrange 18 espécies, inclusive as ultimamente por nós descritas na Revista de Entomologia (vol. 12, ano 1941). Cada espécie deste gênero é intimamente ligada a determinada espécie ou gênero de palmeiras, em cujas espatas o inseto se desenvolve.

Suspeitamos que no Brasil, investigada devidamente sua flora palmácea, o número de espécies de *Hoplorhinus* chegará facilmente a uma centena. Na descrição das espécies, julgamos de utilidade indicar a espécie botânica em que vive, o que

1) A. Klima, no *Coleopterorum Catalogus* de W. Junk, parte 146, 1936, Curculionidae: Eriirrhinae, adotou a grafia do gênero *Hoplorhinus*. A. Hustache usa, entretanto, dois rr: «Hoplorrhinus», o que induziu-nos a certa vacilação na grafia do nome nas publicações anteriores. D'aqui por diante usaremos a grafia mais simples de A. Klima.

facilitará a identificação do inseto. Às espécies já descritas adicionamos dez novas.

a) *Hoplorhinus fontenellei*, n. sp.

Grande, preto-uniforme, fosco, élitros sem estrias longitudinais pronunciadas. Dimorfismo sexual notável.

Macho. — Cabeça trapezoidal, pontilhação fina, olhos grandes, lateralmente salientes; fronte afundada, rugosa, com pêlos espaçados fortes, curtos, pretos; rostru pouco mais longo do que o protorax, reto, horizontal, mais grosso na base, alargado no ápice, com cinco carenas, das quais três fortes na face superior: a mediana lisa e as duas laterais ornadas na frente de 7 pares de tubérculos de tamanho variável, mais longos na inserção antenal.

Antenas postmedianas, arruivadas, glabras; escapo linear, pouco clavado; funículo com o primeiro segmento longo, do comprimento dos dois seguintes juntos; o segundo subigual ao terceiro e quarto juntos; 5-7 subiguais; clava longo-cônica na base, curto-cônica no ápice.

Protorax com a base reta; lados arredondados, mais largos na metade dianteira, estreitando-se depois em linha reta, formando um cone obtuso, com colo curto; dorso abaulado, pontilhação fina; linha mediana marcada com ligeira saliência na metade frontal; pilosidade curta, espaçada, mais densa no colo; esterno liso, fosco, glabro; protorax sensivelmente mais largo do que os ombros dos élitros.

Élitros com estrias longitudinais pouco marcadas, de pontilhação finíssima; pilosidade preta, espaçada, curta.

Coxas dianteiras separadas. Femures longos, dilatados nos dois terços distais, terminando a dilatação em dente. Tíbias pilosas no lado interno, armadas de esporão no ápice.

Comprimento do corpo, inclusive o rostru 16 mm.; rostru 5 mm.; protorax e cabeça 5 mm.; sobre 4,5 mm. de maior largura; élitros 6 mm. de compr. sobre 4 mm. de largura nos ombros.

Fêmea difere do macho pelo bico fino, liso, longo, curvado, quase duas vezes mais longo do que o protorax; antenas ligeiramente antemedianas; tíbias dianteiras com o esporão no ápice mais agudo; protorax mais curto e mais estreito.

Descrito sobre 18 machos e 30 fêmeas, colhidos pelo autor em 12-6-41 na inflorescência de *Attalea compta* Mart., na fazenda «Babassú», município de S. Mateus, Est. do Espírito Santo.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

A espécie difere das demais pelo tamanho, gigantesco no gênero, pela cor uniforme preta etc. Parece-se um tanto com *Rhina barbirostris*.

Desenvolve-se provavelmente nas espatas da mesma palmeira, pois verificámos furos de saída, que correspondem ao tamanho da nova espécie.

Dedicamos a espécie ao colega Napoleão Fontenelle, de Vitória, Espírito Santo, que gentilmente nos acompanhou na memorável excursão, facilitando o êxito da mesma.

b) *Hoplorhinus capichaba*, n. sp.

Grande, corpo amarelo claro; cabeça, rostro, colo estreito do protorax, juntas das patas, manchas basais e anteapicais nos élitros pretos; tarsos e pigídio na face dorsal enfumados; élitros sem estrias longitudinais.

Macho. — Cabeça pequena, pontilhação fina, olhos grandes, salientes, fortemente espaçados na frente; rostro horizontal, subreto, grosso, com duas carreiras de dentes irregulares na face superior frontal da metade basal; na inserção das antenas duas cristas mais longas; no terço apical um par de dentes e outras asperidades menores; ápice pouco alargado, provido de pêlos grosseiros, esparsos.

Antenas ligeiramente postmedianas, ruivas; o primeiro segmento do funículo do comprimento dos dois seguintes juntos; segmentos 4 a 7 subiguais, curtos; clava pouco grossa, segmento basal tubular ocupando a metade, o intermediário curto, o apical cônico.

Protorax amarelo luzente, subcircular, pouco mais largo do que os ombros dos élitros; pontilhação finíssima; base subreta, lados arredondados, subretos na metade anterior; dorso pouco saliente, ligeiramente côncavo na parte mediana anterior; colo curto, preto. Escudo pequeno, preto, subtriangular, afundado. Élitros com linha estreita na base e bordos internos pretos; uma grande mancha nos ombros e uma externa perto do ápice pretas.

Coxas dianteiras pouco separadas; femures lisos, fortemente dilatados, armados com um dente no quarto distal nos três pares; tíbias retas, pilosas para a extremidade, alargadas no ápice, prolongadas em esporão obtuso no par trazeiro.

Comprimento total 10 mm.; rostro e cabeça 3 mm., protorax 3 mm., élitros 4 mm. de compr., sobre 2,8 mm. de largura.



Fêmea difere pelo rostro fino, liso, mais longo e recurvado; antenas antemedianas; protorax menor, mais estreito do que os élitros; tíbias sem esporão.

Descrito sobre 2 machos e 1 fêmea, colhidos pelo autor em 12-6-41 na inflorescência de *Attalea compta* Mart. na fazenda «Babassú», município de S. Mateus, Est. do Espírito Santo.

Cotipos na coleção do autor.

A espécie facilmente se distingue das outras do mesmo gênero pelo colorido amarelo claro luzente do protorax, corpo achatado, manchas nos élitros etc. Suspeitamos a espécie criar-se nas espátas da mesma palmeira.

c) *Hoplorhinus marizae*, n. sp.

Tamanho mediano. Dimorfismo sexual acentuado.

Macho. — Cabeça pequena, ruiva, lisa; olhos pretos, pouco salientes; rostro ruivo, mais longo do que o protorax, horizontal, pouco curvado, não alargado no ápice; três pares de dentes nas carenas marginais da face superior preantenal, cristas mais compridas na inserção das antenas, cinco pares de dentes na parte postantenal.

Antenas postmedianas, ruivas, funículo delgado; segmentos 1-3 subiguais, 4-7 progressivamente menores; clava longa, pouco engrossada, primeiro segmento longo-cônico, os dois terminais curto-cônicos.

Protorax preto, mais largo do que os ombros dos élitros, pouco mais longo do que largo, abaulado, luzente, pontilhação finíssima no dorso; lados longo-arredondados. Escudo minúsculo, preto.

Élitros amarelo-escuros, com os bordos internos e externos pretos, exceto o ápice; uma forte mancha preta, submarginal, pouco atrás do meio; estrias longitudinais pronunciadas.

Patas amarelas, escurecidas nas juntas, glabras, luzentes; femures nos 3 pares dilatados, armados de forte dente perto do ápice, seguido de saliência grossa, obtusa; tíbias arqueadas, inermes no ápice. Abdomen amarelo.

Comprimento total 11 mm., rostro e cabeça 4 mm., protorax 3 mm. de compr. sobre 2,6 mm. de largura; élitros 4 mm.

Fêmea sensivelmente menor e de cor diferente; rostro cerca de duas vezes mais longo do que o protorax, fino, liso, recurvado; antenas antemedianas; terceiro segmento do funículo curto, do comprimento dos ulteriores.

Protorax ruivo, pontilhação mais pronunciada.

Élitros ruivos, colorido escuro dos bordos menos carregado. Femures dianteiros com dentes simples; tíbias inermes.

Descrito sobre 120 espécimens, sendo 28 machos, apanhados pelo autor em 12-6-41 na inflorescência de *Attalea compta* Mart., na fazenda «Babassú», Est. do Espírito Santo.

Cria-se nas espatas da mesma palmeira.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

Dedicamos a espécie à senhorinha Mariza Fontenelle, Vitória, que revela grande entusiasmo pela entomologia.

d) *Hoplorhinus bifasciatus*, n. sp.

Fêmea. — Amarelo-fosco-uniforme; olhos, rosto, uma mancha estreita alongada no meio de cada élitro pretos. Corpo ligeiramente mais largo do que alto.

Cabeça amarela luzente; olhos pouco salientes, subcontíguos na frente, afastadas em ângulo para traz; rosto curto, do comprimento do protorax, recurvado, fino, liso. Antenas ligeiramente antemedianas, ruivas; o escapo atinge o olho; primeiro segmento do funículo longo, do comprimento do segundo, porém mais grosso; o terceiro cerca da metade dos precedentes; 4-7 curtos, progressivamente mais grossos; clava com o segmento basal longo, cônico, ocupando dois terços de seu comprimento; os dois apicais curtos, cônicos.

Protorax com a base bisinuosa, lados arredondados, subretos na metade anterior, formando colq curto; dorso convexo, fosco pelas pontilhações finas, pêlos curtos, ruivos, espaçados; largura pouco menor que a dos ombros.

Escudo pequeno, arredondado na ponta.

Élitros com 9 estrias longitudinais pronunciadas, formadas pelas covinhas alinhadas no fundo de sulcos; cristas intermediárias guarnecidas de carreira de pêlos grossos e curtos; toda a superfície aveludada de pilosidade fina, amarela. No meio de cada élitro, na saliência da quarta estria longitudinal, há uma mancha preta, estreita, cerca de 1 mm. de compr., sobre um quarto de mm. de largura.

Patas mediócras; femures de três pares com pequeno dente no quarto apical alargado. Tíbias curtas, pilosas; tarsos enfumados.

Compr. total 9,5 mm., rosto 2 mm., cabeça e protorax 2 mm., élitros 5,5 mm., com 2,5 mm. de maior largura na metade posterior.

Descrito sobre 2 fêmeas, colhidas pelo autor, em 12-6-41, em flores de «pindóba» (*Attalea humilis?* Mart.), no município de S. Mateus, Est. do Esp. Santo.

Cotipos na coleção do autor.

Distingue-se facilmente de outras espécies de élitros maculados, pelas estrias lineares e não arredondadas. Do *H. bipunctatus* Hust. difere também pelo corpo robusto, menos cilíndrico, mais aplanado, protorax proporcionalmente mais curto.

c) *Hoplorhinus biancae*, no sp.

Vermelho-escuro-luzente; uma faixa difusa transversal no meio dos élitros preta; corpo achatado.

Macho. — Cabeça pequena, vermelha, poucos pêlos junto dos olhos; olhos pretos, pouco salientes, fortemente separados na frente pela base carenada do rostro; este é do comprimento do protorax, horizontal, subquadrangular, vermelho, grosso, subreto, pouco dilatado no ápice; carena mediana lisa, duas carenas marginais na face externa com 3 pares de dentes subiguais na metade basal; cristas alongadas na inserção das antenas e dois pares de dentes no terço apical. Antenas postmedianas; funículo com os segmentos 1 e 2 longos, subiguais em comprimento, o primeiro mais grosso; segmentos 3-7 subiguais, pouco mais longos do que largos; clava com o segmento basal ocupando pouco mais que a metade do comprimento; os dois restantes curto-cônicos.

Protorax luzente, achatado no meio, pontilhação arredondada, pequena, intervalada pelo dobro do diâmetro das covinhas; base subreta; lados longo-arredondados, subretos para a frente; colo pequeno, com pêlos curtos no bordo anterior; largura subigual ao comprimento, da largura dos ombros.

Escudo minúsculo, escuro.

Élitros brilhantes, 9 carreiras longitudinais formadas pelas covinhas fortes, arredondadas, juntas, de fundo escuro e elevações intervalares pouco salientes, glabras; pêlos escassos, curtos, arruivados, partindo de covinhas, mais frequentes nas margens e no ápice dos élitros. Uma mancha preta, larga, irregular, com bordos difusos, apenas esboçada ou ausente, atravessa a metade do élitro; a sutura dos élitros na metade basal escurecida.

Patas ruivas. Coxas dianteiras fortemente separadas; fêmur nos três pares notavelmente grosso, formando forte dente

em ângulo reto perto do ápice; tíbias curvas; esporão curto, em forma de tubérculo.

Compr. total até 7,5 mm., rostro 2 mm., protorax 2 mm., élitros 3,5 mm.

Fêmea difere pelo rostro fino, incurvado, liso, mais comprido que o protorax; antenas no terço basal; pontilhação do pronoto mais pronunciada e unida, dando aspecto áspero; uma área lisa mediana longitudinal.

Descrito sobre 3 machos e 6 fêmeas, colhidos pelo autor em flores de *Attalea compta* Mart. no município de Jequié, Est. da Baía e no munic. de S. Mateus, Estado do Espírito Santo, na fazenda «Babassú».

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

Dedicamos a espécie à gentil senhorinha Bianca Braga, filha do proprietário da fazenda «Babassú», onde fizemos maravilhosa colheita de *Hoplorhinus*.

Distingue-se das demais pelo conjunto de caracteres, especialmente pelas carreiras de covas fundas nos élitros.

f) *Hoplorhinus humilis*, n. sp

Pequeno, cilíndrico, amarelo-uniforme; olhos, manchas ligeiramente post-medianas dos élitros pretos.

Macho. -- Cabeça pequena, amarela; olhos grandes, pretos, pouco separados na frente; rostro inclinado, subquadrangular, grosso, pouco curvado, avermelhado; carena mediana lisa; carenas laterais com dentes pequenos escuros; antenas postmedianas, finas; funículo esparso-piloso; os dois segmentos basais subiguais em comprimento; o primeiro mais grosso; 3-7 progressivamente mais curtos e arredondados; clava globosa-alongada; o segmento basal ocupa dois terços do seu compr.; segmentos apicais curto-cônicos.

Protorax alongado, base sinuosa, lados arqueados, colo pronunciado, superfície áspera pelas pequenas covinhas, guarnecidas de pêlos curtos, amarelos; linha mediana ligeiramente afundada.

Élitros fortemente estriados, pilosidade curta, amarela; duas manchas circulares pretas nas estrias 3-4; ombros da largura do protorax.

Patas amarelas; coxas dianteiras separadas; femures nos 3 pares com forte dente agudo.

Compr. total 6,5 mm., sobre 1,5 mm., protorax 1,5 mm., élitros 3,5 mm.

Fêmea difere pelo rostro fino, fortemente recurvado, antenas ligeiramente ante-medianas.

Descrito sobre 16 machos e 38 fêmeas, apanhadas em flores de «pindoba» (*Attalea humilis?* Mart.) no Estado do Espírito Santo.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

g) *Hoplorhinus landeiroi*, n. sp.

Amarelo fôco, tamanho médio, subcilíndrico, rostro inclinado; sutura dos élitros escurecida.

Macho. — Cabeça vermelha, pontilhada, pequena, com poucos pêlos; olhos pretos, não salientes, distantes na fronte; rostro vermelho, grosso, curvado, desviado para baixo, quadrangular, sem dentes nas duas carenas frontais, áspero; antenas postmedianas, vermelhas; primeiro segmento do funículo clavado, longo, cerca de duas vezes mais comprido do que o segundo; terceiro metade do segundo; 4-7 subiguais; clava com o segmento basal longo, perfazendo dois terços do comprimento.

Protorax alongado, bisinuoso na base, longo-arqueado dos lados; colo pouco marcado; pronoto áspero, curto-piloso; linha mediana ligeiramente saliente.

Élitros uniforme-amarelo-escurecidos; estrias longitudinais pouco fundas; carenas com pêlos curtos, doirados.

Patas amarelas; coxas dianteiras subcontíguas; femures nos 3 pares alargados; um dente no terço apical; um esporão nas tíbias; tarsos vermelho-carregados.

Comprimento total de 7 a 8 mm., rostro 1,8 mm., protorax 2 mm., élitros 4 mm.

Fêmea difere pelo rostro fino, mais arqueado, liso, mais curto, antenas ante-medianas, protorax mais curto, etc.

Descrito sobre 280 espécimens, dos quais um terço são machos; extraídos pelo autor, em 5-6-41 das espátas internas de *Cocos picrophylla* B. Rodr. em Vitória, Estado do Espírito Santo.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

Dedicamos a espécie ao colega Rubem Landeiro, bom

companheiro e colaborador na cata de *Hoplorhinus* nas viagens pelo Estado do Espírito Santo.

h) *Hoplorhinus buri*, n. sp.

Amarelo-pardacento-fôsko, cilíndrico, tamanho acima do mediano; uma mácula escura apagada no meio do pronoto e duas na metade posterior de cada élitro.

Macho. — Cabeça vermelho-escura; olhos pretos, distantes; rostro mais curto do que o protorax, grosso, pouco recurvado, carenado, áspero, dentado na face; antenas postmedianas, vermelhas, escrobo escuro; funículo com o segmento basal moderadamente longo, engrossado, o segundo pouco mais curto; 3-7 curtos, subiguais; clava com o primeiro segmento ocupando dois terços do seu comprimento.

Protorax da largura dos élitros, alongado-arredondado dos lados, colo curto; pronoto áspero, rugoso, obscurecido no meio; escaminhas minúsculas e pêlos maiores ruivos.

Élitros foscos, estriados, cobertos de pequena pubescência ruiva; nas cristas há carreiras de pêlos maiores; na metade posterior nas estrias 4-6 há duas máculas escuras de bordos pouco nítidos, às vezes ausentes nos machos; uma mácula pigmentada nos ombros.

Patas amarelas; coxas dianteiras separadas; femures na base com anel preto, alargados no meio; dente anteapical; tíbias curvas, alargadas no ápice.

Compr. 7 mm., rostro 1,7 mm., cabeça e protorax 1,8 mm.; élitros 3,5 mm.

Fêmea de tamanho subigual ou maior; rostro recurvado e fino, luzente, mais alongado; antenas submedianas.

Descrito sobre 4 machos e 11 fêmeas, apanhados pelo autor em 13-6-41 em flores de «buri» (*Diplothemium caudescens* Mart.), no município de S. Mateus, Est. do Espírito Santo.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

Difere das demais espécies pelo conjunto dos caracteres. De *Hoplorhinus hustachei* Bondar, que se cria na mesma palmeira, no Est. da Baía, difere pelo tamanho menor e distribuição das máculas no protorax e élitros.

i) *Hoplorhinus spinosus*, n. sp.

Macho. — Tamanho médio; protorax preto, élitros piceo-amarelados, com larga mancha preta no meio.

Cabeça pequena, arruivada; olhos pretos, espaçados na fronte por um largo afundamento, seguido de uma pequena saliência frontal; rostró castanho, grosso, curvado, pouco mais curto do que o protorax; duas carenas frontais com dentes pronunciados, dos quais 3 pares nos dois terços basais, antes da inserção antenal e 5-6 pares no terço apical, postantenal. Antenas postmedianas, vermelhas; segmentos 1 e 2 do funículo subiguais em comprimento, sendo o basal mais grosso; segmentos 4-7 curtos, subiguais; clava com o segmento basal ocupando três quartos, o segundo curto, anelar, o terceiro cônico.

Protorax escuro-píceo, áspero, bisinuoso na base; lados curto-arqueados na base, subretos, convergentes nos dois terços dianteiros; largura subigual à dos élitros, pouco mais longo do que largo; pronoto achatado, coberto de pêlos curtos, esparsos; uma depressão, longitudinal mediana, pouco funda, não atingindo a base.

Élitros paralelos, achatados, estriados com 9 sulcos; de cor castanha, mais claros que o protorax; uma mancha preta, mal definida na região mediana, partindo da quarta estria para a margem; pilosidade densa, escura; carenas longitudinais guardadas de uma carreira de pêlos doirados, curtos e fortes.

Patas assaz compridas; o par dianteiro píceo, os dois posteriores avermelhados; coxas dianteiras contíguas; femures alargados; um dente duplo no quarto apical; tíbias curvas no quarto distal, providas de forte esporão desviado; femures dos segundo e terceiro pares com dente simples; tíbias com esporão curto. Abdomen avermelhado castanho; pilosidade densa.

Comprimento total 9,5 mm., rostró 2,5 mm., protorax e cabeça 3 mm., sobre 2,5 mm. de largura; élitros 4 mm. de compr., sobre 2,5 mm. de largura.

Descrito sobre um exemplar, extraído pelo autor do pedúnculo floral morto de *Diplothemium caudescens*, dentro do qual a espécie se desenvolve; Est. de Espírito Santo.

Tipo na coleção do autor.

Difere das demais espécies pelo colorido, particularidades do rostró, antenas, femures dianteiros etc.

j) *Hoplorhinus similis*, n. sp.

Fêmea de tamanho médio, colorido uniforme amarelo-avermelhado, uma mácula preta, circular, em cada élitro.

Cabeça vermelha, luzente, pontilhação fina; olhos pretos, pouco salientes, distanciados na frente; rostró vermelho, en-

grecido nos escrobos, fino, curvado, liso, do comprimento do protorax e cabeça juntos. Antenas antemedianas, vermelhas; primeiro segmento do funículo cônico, duas vezes mais longo do que grosso; o segundo do mesmo comprimento, porém fino; 3-7 progressivamente mais curtos, de largura pouco menor que o comprimento; clava com o primeiro segmento basal ocupando dois terços do seu comprimento.

Protorax fôsko, áspero, sinuoso na base, lados arredondados, colo pronunciado; pilosidade curta, ruiva; largura subigual ao comprimento, pouco menor que a largura dos ombros.

Élitros fortemente estriados; carreiras de pêlos amarelos curtos nos intervalos; reflexo luzidio; na metade das estrias 4 e 5 uma mancha circular preta.

Patas avermelhadas, curto-pilosas; coxas enegrecidas, as dianteiras separadas. Femur dianteiro moderadamente grosso, provido de dente cônico, mais longo do que largo; tíbias nos três pares com esporão fino.

Descrito sobre um exemplar, apanhado pelo autor em 12-4-41 em flores de *Attalea compta* Mart., no município de S. Mateus, Est. do Espírito Santo.

Tipo na coleção do autor.

Difere das espécies concolores pelo conjunto de caracteres: de *H. biancae* pelo protorax áspero e não pontilhado de covinhas redondas; pelas particularidades do funículo e conformação dos femures dianteiros. De *H. humilis* difere pelo protorax mais curto e conformação dos femures além da diferença nas estrias dos élitros, mais pronunciados em *H. humilis* e de reflexo luzente, pela ausência da pilosidade densa e fina que existe em *H. humilis* etc.

### 3) Gênero *Derelomus* Schönh. 1826

A nova significação e mais amplo conteúdo que presentemente adquirem os gêneros brasileiros *Phytotribus* e *Hoplorhinus*, aproximam-nos dos Dereloméneos e, especialmente, do gênero básico *Derelomus*, de tal modo que é difícil, às vezes, separá-los morfologicamente.

Conforme Lacordaire, os Dereloméneos possuem:

«Rostro alongado, fino, cilíndrico, escrobos oblíquos ou em parte visíveis lateralmente. Antenas mediocres ou assaz longas, finas; funículo de sete segmentos. Prosterno assaz longo, não excavado na frente. Élitros encobrindo o pigídio. Coxas dianteiras globosas, bastante pequenas, pouco separadas; femures sem dentes; tíbias inermes no ápice; unhas dos tarsos livres. Segundo segmento abdominal pelo menos tão longo como os dois seguintes juntos, retilinear atrás,



como os posteriores, soldado ou não com o primeiro segmento. Metasterno assaz longo, seus episternos estreitos. Saliência mesosternal mais ou menos estreita. Corpo alongado».

O gênero *Derelomus* se reconhece nesse grupo pelos femures não pedunculados na base.

A. Hustache inclui no gênero *Derelomus* a espécie *elaeisae* Hustache, abaixo descrita, que possui o rostro grosso nos machos, coxas afastadas, tíbias armadas. Descrevemos também *D. sternicornis* Bond., com tíbias armadas de esporões, e duas outras espécies com o mesmo característico.

A conformação das patas aproxima *Derelomus* do *Phytotribus*.

Resumimos nossas dúvidas.

Não há diferença nítida na forma do rostro nas fêmeas dos dois gêneros. A forma das antenas é variável nos dois gêneros. O protorax não oferece base diferencial. A forma do corpo em *Derelomus* pode ser alongada, cilíndrica, com os lados paralelos, como em *Phytotribus* e *Hoplorhinus*, como temos exemplo em *Derelomus sternicornis* Bondar. Nas patas existe a mesma dificuldade taxonômica. Há, entretanto, a diferença biológica.

*Phytotribus* e *Hoplorhinus*, como apontamos antes, desenvolvem-se nas espadas de palmeiras.

As espécies de *Derelomus* desenvolvem-se em flores masculinas, nas quais completam em 20-25 dias o ciclo evolutivo.

O conhecimento da biologia facilita a distribuição pelos gêneros. Infelizmente possuímos espécies, apanhadas nas flores de palmeiras, cuja biologia não tivemos oportunidade de verificar.

Na dúvida quanto à colocação no gênero, guiamo-nos pela seguinte discriminação:

*Hoplorhinus*. — Femures geralmente armados de dente na dilatação; tíbias com ou sem esporão.

*Phytotribus*. — Femur dilatado, geralmente inerte, tíbias com esporão, rostro do macho sem dentes; antenas com o último segmento do funículo largo.

*Derelomus*. Femur dilatado, inerte, tíbias inertes ou, quando armadas, o sétimo segmento do funículo estreito, não fazendo parte da clava; corpo, geralmente, mais compacto, proporcionalmente mais largo.

Em Notas Entomológicas da Baía, VII, no fascículo precedente desta Revista, apresentamos algumas considerações biológicas sobre *Derelomus* e mencionamos *D. elaeisae* Hust., cuja diagnose ainda não está divulgada.

A. Hustache nos comunicou este nome ao início de 1940. Os acontecimentos posteriores na França interromperam a correspondência. Julgamos útil descrever a espécie, respeitando o nome dado pelo autor da mesma e adicionamos uma espécie nova.

a) *Derelomus elaisae* Hustache, 1940, n. sp.

Pequeno, amarelo-acastanhado, duas manchas no pronoto e uma longa em cada élitro pretas; corpo achatado; dimorfismo sexual pronunciado.

Macho. — Cabeça grande, fino-pontilhada, lisa, amarela, obscurecida na testa; olhos pequenos, pretos, no ângulo lateral inferior entre a cabeça e o rostro largamente afastados pela base proeminente do rostro. Rostro grosso, cônico, vertical, arqueado, carenado, rugoso, covinhas minúsculas nos sulcos, esparso-dourado piloso, comprimento subigual ao da cabeça e protorax reunidos.

Antenas no terço apical, ruivas; primeiro segmento do funículo grosso, do comprimento dos dois imediatos; 3-7 subiguais em comprimento, progressivamente pouco alargados, largura subigual ao comprimento; clava unida, longo-ovalada, do comprimento dos três e meio segmentos precedentes, côr enfumada, os dois segmentos terminais minúsculos.

Protorax áspero, fôsko, largo na base, subcônico, base pouco sinuosa; duas manchas redondas pretas, grandes, simétricas no dorso, às vezes espalhadas em todo o protorax, tornando-o piceo, divergindo em coloração dos élitros; dorso achatado; covinhas circulares, irregularmente espaçadas em toda a superfície; largura pouco ultrapassando o comprimento. No prosterno, entre as duas coxas, uma lâmina larga, em forma de lingueta, inclinada para a frente.

Élitros da largura do protorax, o comprimento um pouco menor que o dobro da largura; fortemente estriados com covinhas alinhadas circulares; glabros, pilosidade fina, esparsa, alinhada; margem externa no ombro e no terço apical enfumada; mancha comprida preta, longitudinal, com bordos difusos nas estrias 4-5; em muitos indivíduos essa mancha é rompida ou ausente.

Coxas dianteiras separadas pela base da lingueta; femures dilatados, inermes, pilosidade microscópica, esparsa; tíbias retas, progressivamente alargadas, fino-pilosas na segunda metade, armadas de esporão obtuso e espinhos pequenos longitudinais no ápice; tarsos carregado-ruivos, o quarto artículo do comprimento dos três basais.

Esterno e abdomen glabros, lisos.

Comprimento, inclusive a cabeça, protorax e élitros, até 3 mm., geralmente menor; largura 1,2 mm.

Fêmea difere pelo bico mais fino, mais longo, liso, menos curvado, antenas ligeiramente antemedianas, coxas dianteiras subcontíguas, sem a lingueta prosternal.

Descrito sobre 100 espécimens, machos e fêmeas, criados pelo autor em flores masculinas de dendezeiro (*Elaeis guineensis*), na Baía.

Cotipos na coleção do autor, na do Prof. A. Hustache, no Museu Paulista e no Field Museum of Natural History, Chicago.

A espécie é de fácil identificação pelas manchas escuras alongadas nos élitros e pela lingueta intercoxal nos machos.

O inseto se encontra nas inflorescências masculinas do dendezeiro em verdadeiros enxames, criando-se em cada flôr de 1 a 5 indivíduos. O tamanho do inseto é bastante variável conforme o alimento disponível para cada larva.

Destruindo o pólen do dendezeiro, o inseto pôde prejudicar a fertilização das flôres femininas, e sob este aspecto deve ser considerada nociva à cultura dessa palmeira.

b) *Derelomus binotatus*, n. sp.

Pequeno, amarelo-grisalho, cabeça mais avermelhada, olhos pretos, uma grande mancha escura na metade posterior de cada élitro; superfície áspera, fosca, pilosa; pilosidade de diversos tamanhos. Dimorfismo sexual nota-se no rosto.

Macho. — Cabeça lisa, olhos pretos, rostro grosso, vertical, carenado, pouco curvado, pouco mais longo do que o protorax, pêlos minúsculos, esparsos.

Antenas subapicais, escapo glabro; primeiro segmento do funículo de um quarto mais longo do que o segundo e mais grosso; segmentos 3-7 subiguais; clava grossa, do comprimento dos quatro segmentos precedentes; segmento basal longo-cônico, cerca de 4 vezes mais comprido do que os dois terminais, subiguais em comprimento.

Protorax de comprimento subigual à largura; base bisinuada, lados arqueados; colo indistinto; dorso pouco convexo, áspero pelas covinhas densas, do fundo das quais partem escaminhas amarelo-claras, chatas, curtas, minúsculas; escamas maiores esparsas, subretas, claviformes em todo o pronoto, diminuindo nos flancos e no esterno.

Élitros ligeiramente mais largos do que o protorax na

base, da largura do protorax no meio; margens subparalelas; estriados pelas carreiras de covinhas distantes, pigmentadas no fundo; nos intervalos uma carreira de cerdas doiradas grossas e longas; no fundo há uma pilosidade fina, linear, numerosa, espaçada, sem alinhamento definido. Em cada élitro uma grande mancha preta circular postmediana, submarginal (solúvel em bálsamo na preparação microscópica).

Coxas globosas, subcontíguas, femures dilatados inermes, pilosidade fina; tíbias recurvadas nas duas extremidades, densamente pilosas, armadas no ápice com pequeno esporão desviado; nas patas trazeiras o primeiro tarso mais longo do que o segundo.

Esterno e abdomen finamente pilosos; o segundo segmento abdominal com o ápice reto e subigual em comprimento aos dois imediatos juntos. Aparelho genital fusiforme, achatado, curvado para o ápice, bifurcado na ponta.

Comprimento do corpo, cabeça, protorax e élitros 2,5 mm., largura cerca de 1 mm.

Fêmea difere pelo rostro mais fino e liso, glabro, exceto na base; antenas ligeiramente postmedianas.

Descrito sobre abundante material, 390 exemplares, colhidos pelo autor em 12-6-41 em flores de *Attalea compta* Mart. na fazenda "Babassú", município de S. Mateus, Est. do Espírito Santo.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

Difere das demais espécies conhecidas pelas manchas escuras nos élitros, pilosidade característica etc Não há dados exatos sobre o modo de vida.

#### 4) Gênero *Ancylorrhynchus* Gemm. e Har. 1871

O gênero tem os seguintes caracteres:

«Antenas longas; funículo de 6 segmentos, dos quais os três basais longos, sub-obcônicos, o intermediário mais comprido; os restantes subturbinados; clava alongada, oval, acuminada. Rostro alongado, forte, sub-achatado, para o ápice dilatado. Olhos grandes, laterais, sub-ovais. Protorax transversal, estreitado para a frente; ângulos posteriores subacuminados; dorso pouco convexo. Élitros largos, subovais, não convexos, conjunto apical arredondado, mais longos do que o abdomen. Pés curtos, fortes; femures dilatados, unidentados por baixo; tíbias compressas».

Este gênero abrange presentemente um total de nove espécies, todas do continente sul-americano, provenientes das regiões onde se encontram palmeiras nativas do gênero *Cocos*.

Adicionamos mais duas espécies, que consideramos novas.

a) *Ancylorrhynchus blevi*, n. sp.

Grande, oval; derme de côr ferrugineo-avermelhada uniforme, coberta pelas escaminhas densas, amarelo-claras; rostró vermelho-escuro, preto no ápice; olhos pretos; uma faixa escura no colo envolvendo o protorax.

Cabeça pequena, cônica, denso-escamosa; escaminhas pequenas, largas, amarelo claras; olhos grandes, pouco proeminentes, largamente separados na fronte e no pescoço. Rostro forte, inclinado, pouco recurvado, mais espesso na base, dilatado no ápice, de um quarto mais longo do que a cabeça e protorax juntos; face superior com sete carenas fortes, glabras, das quais uma mediana e três de cada lado, convergindo em ângulo agudo na inserção de antenas; escaminhas minúsculas, densas nos intervalos rugosos entre as carenas. Mandíbulas com dente apical estreito e outro mais largo e longo imediato.

Antenas subapicais; escapo envergado, piloso no terço distal alargado; funículo com os segmentos 1-3 longos, dos quais o intermediário mais comprido; 4-6 progressivamente mais longos e largos; clava com os segmentos basal e apical subiguais em comprimento, o intermediário um pouco mais curto.

Protorax cônico, base larga, bisinuosa, ângulos pouco arredondados, lados subrétos; côlo pouco marcado, faixa escura submarginal; dorso pouco convexo, linha mediana ligeiramente mais alta; densamente escamoso; flancos separados do pronoto pelas dobras laterais. Prosterno curto; lobos postoculares pronunciados, separados pelo sulco, ciliados no olho; pescoço escavado, um terço mais largo que comprido, muito mais estreito do que os ombros dos élitros.

Escudo grande, trapezoidal, mais largo para o ápice, escamoso.

Élitros com os ombros arredondados, margens alargadas para o terço posterior, envolvendo o abdomen, extremidade em conjunto arredondada; estrias longitudinais marcadas pela côr vermelho escura, mais pronunciadas perto da sutura; dorso ligeiramente abaulado, densamente escamoso; escamas pequenas, chatas, fusiformes, amarelo-claras; compr. 7 mm., larg. 5 mm.

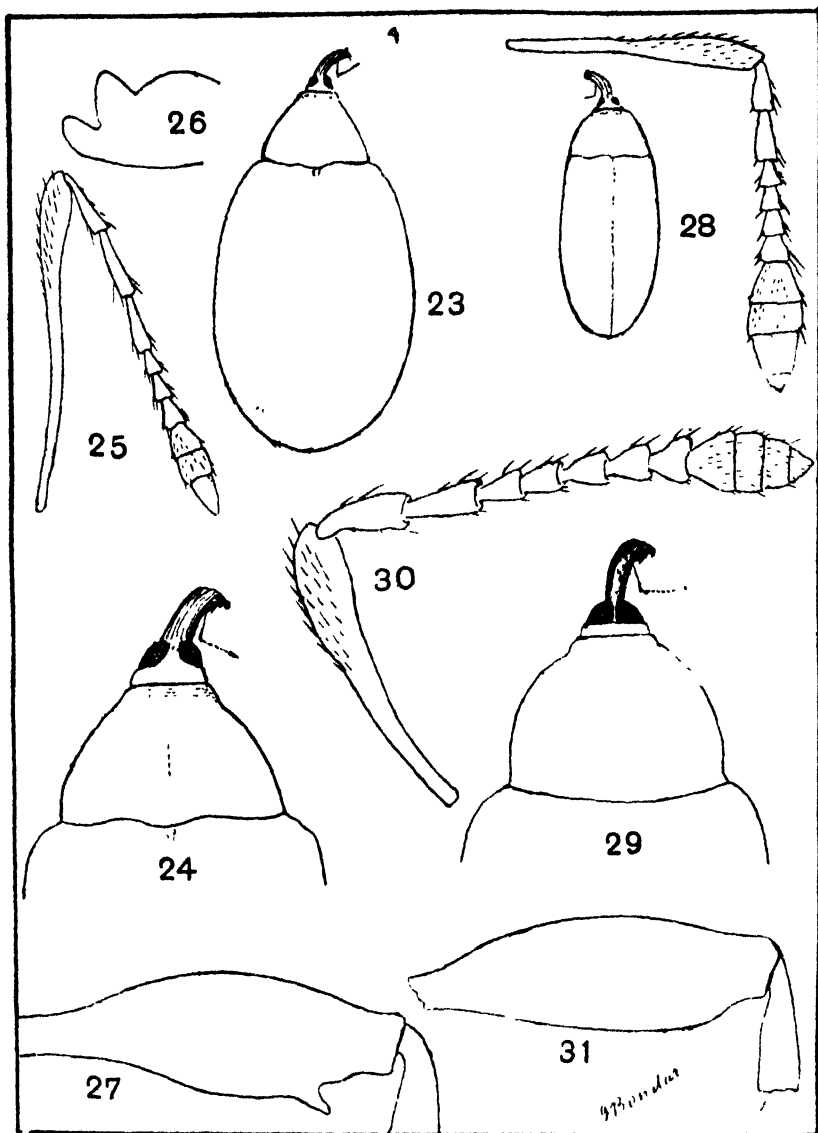


Fig. 23. *Aneylorrhynchus bleyi* n. sp., configuração do corpo. — Fig. 24. *Idem*, cabeça e pronoto. — Fig. 25. *Idem*, antena. — Fig. 26. *Idem*, mandíbula. — Fig. 27. *Idem*, femur anterior. — Fig. 28. *A. campoi* n. sp., configuração do corpo e antena. — Fig. 29. *Aneylorrhynchodes* (n. g.) *ruschianae* n. sp. cabeça e pronoto. — Fig. 30. *Idem*, antena. — Fig. 31. *Idem*, femur anterior. (Bondar del.).

Coxas dianteiras contíguas, femures pilosos, dilatados, unidentados; tíbias curvadas, pilosas; um pequeno esporão obtuso no par anterior; tarsos pilosos, o primeiro mais longo do que o segundo, 2-3 subiguais, 4.<sup>o</sup> moderado-longo; unhas divergentes, pigmentadas.

Comprimento de cabeça, pronoto e élitros de 6 a 9 mm., maior largura nos élitros 5 mm., compr. do rostro 3,5 mm.

Descrito sobre 9 espécimens, apanhados pelo autor nas inflorescências de *Cocos picrophylla* B. Rodr., nos arredores de Vitória, Est. do Espírito Santo, em 26-6-1941.

Cotipos na coleção do autor, no Museu Paulista e no Field Museum of Natural History, Chicago.

Denominamos a espécie em homenagem ao Major Punaro Bley, Interventor Federal no Estado do Espírito Santo, em reconhecimento das gentilezas que recebemos do Estado e que, entre outras vantagens, nos proporcionaram o estudo da entomologia das palmeiras capichabas.

Pelo tamanho grande, a espécie se aproxima de *A. botryophorae* Bondar, porém é maior, não possui pigmento preto no esterno, o rostro é ruivo, as estrias nos élitros marcadas de escuro; o lobo ocular no colo mais pronunciado, segmentos 4-6 do funículo mais curtos e grossos, clava menos delgada, com o quarto segmento invisível.

b) *Ancylorhynchus camposi*, n. sp.

Tamanho médio, alongado, élitros subparalelos, cor uniforme castanho-chocolate, colo do protorax e sutura dos élitros obscurecidos; densamente escamoso, escamas curtas, largas, amarelado-vináceas; terceiro segmento do funículo mais curto do que o primeiro, subigual aos posteriores.

Cabeça globosa densa e finamente escamosa; olhos pretos, pouco salientes, distanciados; rostro grosso, carenado, alargado e curvado no ápice, glabro, ruivo escuro, preto na ponta e nos escrobos, comprimento subigual ao do pronoto; lobos postoculares nulos.

Antenas subapicais, carregado-ferrugíneas; escapo piloso na face externa distal; funículo piloso, o primeiro segmento mais curto que o segundo, o terceiro metade do comprimento do primeiro, subigual aos ulteriores; 3-5 pouco mais longos do que largos, 6 engrossado; clava com o segmento basal ocupando um terço do seu comprimento, segundo quadrangular, segmentos apicais unidos, formando longo cone.

Protorax com base larga, pouco sinuosa, ângulos postlaterais subrétos, lados arqueados na metade basal, ligeiramente côncavos no cólo, pouco marcado; dorso moderadamente convexo; flancos na metade anterior arredondados, no terço basal separados do dorso pela dobra lateral obtusa; largura por um quarto maior do que o comprimento.

Élitros nos ombros subiguais em largura ao protorax, pouco alargados no meio, lados subparalelos, quasi duas vezes mais longos do que largos; estrias longitudinais pouco marcadas pelos sulcos largos e rasos.

Patas com as coxas dianteiras contíguas, globósas; femures escamosos, dilatados, unidentados; tíbias fortemente pilosas; tarsos curtos, densamente largo-pilosos.

Comprimento de cabeça, protorax e élitros até 6,5 mm., maior largura nos élitros até 3 mm., geralmente menor.

Descrito sobre 15 exemplares, apanhados pelo autor em flores de *Cocos campestris* Mart. em maio de 1941, em Jiqui, Baía.

Cotipos na coleção do autor, no Museu Paulista e no Fiel Museum of Natural History, Chicago.

Com a denominação da espécie, homenageamos o Dr. Mário Campos, Presidente do Instituto Central de Fomento Económico da Baía, a quem devemos muitos favores e que mostrou sempre grande compreensão e interesse pelos nossos estudos entomológicos.

Difere a espécie das demais pela cor chocolate-clara, protorax arredondado nos lados, élitros paralelos, subiguais em largura ao protorax, antenas discordantes do gênero pelo terceiro segmento do funículo curto, aproximando-se pela configuração do corpo aos gêneros *Hoplorhinus* e *Phytotribus*, diferindo, porém pelo rostro e ausência de dimorfismo sexual.

##### 5) Gênero *Ancylorrhynchodes*, n. gen.

Aspecto e proporções do corpo como em *Ancylorrhynchus*; rostro grosso; antenas com o funículo de 7 segmentos; clava com 4 segmentos nítidos; prosterno curto, flancos arredondados na metade dianteira; coxas juntas, subcontíguas ao pescoço. Vive em palmeiras.

Genotipo *Ancylorrhynchodes ruschianae*, n. sp.

O novo gênero é uma prova evidente da variabilidade dos nossos Curculionídeos primitivos, que vivem em plantas de famílias antigas, como são as palmeiras, obrigando o taxonomista a alargar os limites dos gêneros anteriormente formulados, como fizemos em *Phytotribus*, *Hoplorhinus* e *Derelomus*.

No caso presente, a espécie é tão divergente do próximo gênero *Ancylorrhynchus* que julgamos necessário criar um gênero novo. Possuindo 7 segmentos no funículo e flancos do protorax duvidosamente separados do pronoto, tanto neste gênero, como na espécie precedente *Ancylorrhynchus camposi*,



estas espécies permitem-nos incluir a antiga subfamília Petalochilinae apenas como tribu na subfamília de Eirrhiniíneos.

a) *Ancylorrhynchodes ruschianae*, n. sp.

Preto uniforme; escamas densas, versicolores, formando manchas nos élitros; olhos subcontíguos na frente; corpo obovoide; femures inermes.

Cabeça avermelhada, lisa, pouco pilosa, sobresaindo do protorax em forma de anel; olhos grandes, dirigidos obliquamente para a frente, sendo a separação na testa muito estreita; rostro forte, vertical, arqueado, pouco mais curto do que o pronoto, mais estreito na base, alargando-se progressivamente para o ápice; luzente, cavernoso nas estrias pouco fundas, sem cristas nítidas; no suposto macho ligeiramente mais reto.

Antenas, na fêmea, que é de tamanho maior, no terço apical; no macho (exemplar menor) mais próximas do ápice; escapo ligeiramente torcido, atingindo o olho, piloso externamente na clava; funículo de 7 segmentos, o primeiro mais grosso, pouco ultrapassando o segundo em comprimento; 3-7 subiguais em comprimento, progressivamente mais grossos; clava nitidamente de 4 segmentos, separada do funículo, segmentos basais subiguais, os dois terminais mais curtos, também subiguais em comprimento; segmentos do funículo com poucos espinhos fortes, clava finamente pilosa.

Protorax com a base larga, ligeiramente arqueado-convexa, ângulos ligeiramente agudos; margens arqueado-convergentes, ligeiramente côncavas no colo pouco pronunciado; dorso moderadamente abaulado, pontuado, denso-escamoso, escamas uniformes, doiradas, e algumas brancas na linha mediana; flancos arredondados na metade dianteira, não separados do pronoto pela dobra; no terço posterior a dobra obtusa separa o pronoto do flanco; esterno curtíssimo, coxas contíguas ao colo; pronoto um terço mais largo do que comprido.

Élitros por um quarto mais largos do que o pronoto; ombros longo-arredondados, lados arqueados, ápice arredondado; dorso finamente pontilhado; estrias longitudinais nítidas; as escamas densas formam manchas variegadas: uma mancha grande, preta, semilunar, glabra, encostada na base, marginada nos lados por estrias paralelas de escamas brancas; na continuação destas, na metade posterior dos élitros, duas manchas longas esbranquiçadas entre as estrias 4 e 5; manchinhas esbranquiçadas e outras enfumaçadas escuras no meio do resto das es-

camas doiradas em todo o dorso. Comprimento dos élitros cerca de 11 mm., sobre 3 mm. de largura.

Coxas dianteiras contíguas, pilosas, femures dilatados, inermes, densamente pilosos; tíbias curvas nas duas extremidades, densamente pilosas; pêlos mais grossos e longos na face posterior; ápice sem esporão, armado de carreiras de robustos espinhos alinhados em roda; nos tarsos os três artículos basais subiguais, curtos, pilosos, o quarto mais longo, provido de fortes pêlos.

Esterno e abdomen densamente doirado-escamosos. O segundo segmento abdominal com o bordo posterior ligeiramente convexo, de comprimento maior do que os dois imediatos juntos.

Comprimento de cabeça, protorax e élitros de 5 a 6 mm.; largura de 2,8 a 3 mm.

Descrito sobre dois espécimens, dos quais o menor é provavelmente o macho; apanhados pelo autor, em 17-6-41, em flores de *Cocos ruschiana* Bondar, no Município de Colatina, Estado do Espírito Santo.

Tipo e paratipo na coleção do autor.

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### A new genus of Neotropical deerflies (Diptera, Tabanidae)<sup>1</sup>

by Cornelius B. Philip, Medical Entomologist,  
United States Public Health Service

Among the new generic names proposed within recent years for groups of Neotropical horseflies, it is strange that the distinctness of a group of 4 species, heretofore placed in *Chrysops*, has not been recognized. These are *C. tanycerus*

1) Contribution from the Rocky Mountain Laboratory (Hamilton, Montana), of the Division of Infectious Diseases of the National Institute of Health.

Osten Sacken (syn. *tanyceras* of authors) from Costa Rica, *C. melanoptera* Hine from Guatemala, *C. megaceras* Bellardi from Mexico and *C. ceras* Townsend from New Mexico. The last 2 species Hine (1917) once considered to be the same.

Through courtesy of Mr. H. Oldroyd of the British Museum, the writer has been privileged to examine a cotype of *Chrysops ceras* Townsend from New Mexico, and a specimen of *C. megaceras* Bellardi from Mexico; their distinctness is confirmed. The frontal callosities are not so tall, but have the same fine wrinkled appearance.

The name *Assipala* (Latin, unit -|-, spade) has been proposed<sup>2</sup> for this group because of the frontal callosities which have been described as like an «ace of spades», with *tanycerus* O. S. as the genotype species. Hine (1925) has suggested the species as having «some characters in common with» *C. longicornis* Macq., the type species of *Kleineana* End. 1925, specimens of which are at hand collected by me in Nigeria, West Africa.

Enderlein based *Kleineana* chiefly on separation of the eyes in the male, a tendency found in a group of Southwestern, Nearctic *Chrysops* and most marked in *C. hirsuticallus* Philip from California. I have not seen the males of either *Kleineana* from Africa, or *Assipala* from the New World, but the females of the two are only superficially similar in the elongation of the scape and pedicel of the antennae. However, the swollen, smooth face and swollen tibiae at once distinguish the former from either *Assipala* or the Nearctic group mentioned above. The *Chrysops*-like eye, wing and abdominal patterns further separate *Kleineana* from *Assipala*.

All antennal segments are much thicker than in *Kleineana longicornis* and the third segments shorter and more chunky in proportion. The faces of the 4 species of *Assipala* are short and receding above the mouth, and the sub-antennal pollenosity has a different distribution than usually seen in *Chrysops*. The palpi are extremely slender, and about half the length of the proboscides. The eyes (revived) show fine scattering maculations more closely resembling *Silvius* than *Chrysops*, although Osten Sacken states that *tanycerus* has unicolorous eyes.

2) See Philip, Canad. Ent. 73:2-14, January, 1941; a "contre temps" prevented the publication of this name when apparently accepted by another periodical in November, 1939. The name *Assipala* is thus dated from the above key and genotype assignment, and not from the present description.

The frontal callosities resemble a broad «ace of spades» with the apex upward; in *megaceras*, Hine has described this structure as «normal for *Chrysops*», and Townsend «more or less rounded diamond shaped, wider than long». Although *melanopterus* is uniformly blackish including the wings, the other 3 species show distribution of infuscation of the wings and abdomen quite unlike the usual *Chrysops* arrangement in this respect.

Because of the shortening of the third antennal segment, and consequent emphasizing of annulation with appearance often approaching pangoniines with more than 5 annuli, placement of the genus in such keys as Hine's (1925, p. 3) and Enderlein (1924, p. 260) is somewhat unsatisfactory.

Comparative measurements of antennal segments do not support Hine's (1917) key for separation of species as tabulated for individual specimens below:

Length (mm.)	Body	Scape	Pedicel	3d Segment
<i>tanycerus</i> O. S.	9	1.25	0.9	0.85
<i>melanoptera</i> Hine	7	1.4	1.1	0.9
<i>cerus</i> Townsend (cotype)	9	1.45	1.1	0.7
<i>megaceras</i> Bellardi	11	1.6	1.2	0.9

His key also reverses distinguishing characters for *cerus* and *megaceras*. The following key to the four species of *Assipala* is therefore offered, based, of course, on very limited material.

- |   |   |
|---|---|
| <p>1. Cuerpo y alas castaño negro; antena delgada . . . . .<br/> <i>melanoptera</i> Hine</p> <p>— Cuerpo bicolor con gris y castaño; alas con manchas de moreno; antena gruesa a lo menos en la parte del fondo . . . . . 2</p> <p>2. Vientre de abdomen, gris uniforme polvilloso, los primeros dos artejos bien hinchados . .<br/> <i>cerus</i> Townsend</p> <p>— Vientre castaño con incisiones de gris, scapo de la ante-</p> | <p>1. Body and wings dull brownish black; antennae slender .<br/> <i>melanoptera</i> Hine.</p> <p>Body bicolored with gray and brown; wings with brown spots; antennae robust at least basally . . . . . 2</p> <p>2. Venter of abdomen uniformly gray pollinose; first 2 antennal segments markedly swollen . . <i>cerus</i> Townsend</p> <p>— Venter brown with gray incisures; antennal scape only,</p> |
|---|---|

- |  |  |
|--|--|
| na hinchado solamente al<br>forado . . . . . 3   | swollen at base . . . . 3  |
| 3. Incisiones abdominales palidos<br>a lo menos en los tergitos<br>posteriores; cellula discal obs-<br>curecida solamente a los ter-<br>minos; callos frontales (♂)<br>mas largos que anchos . . .<br><i>tanycerus</i> O. S. | 3. Abdominal incisures pale at<br>least on posterior tergites;<br>discal cell infuscated only at<br>ends; callosity (♀) taller than<br>broad . . . <i>tanycerus</i> O. S.              |
| -- Incisiones abdominales concolo-<br>res excepto a los triangulos<br>medianos; cellula discal mas<br>de la mitad obscurecida; cal-<br>los frontales (♀) mas anchos<br>que largos . <i>megaceras</i> Bell.                   | -- Abdominal incisures concolo-<br>rous excepting at median<br>triangles; discal cell more<br>than half infuscated; callosity<br>(♀) broader than tall . . .<br><i>megaceras</i> Bell. |

Of their parasitic propensities, the only record we have is of *melanopterus* of which Hine observes them "very persistent in following... and taking every opportunity to bite..."

Specimens examined in this study: *C. caecutiens* (Linn.) (genotype of *Chrysops*) 2 ♂ 4 ♀, Europe; *K. longicornis* (Macq.) (genotype of *Kleineana*) 2 ♀, Lagos, Nigeria; *A. melanoptera* (Hine) 6 ♀, Guatemala (including one apparently of original series through courtesy of Dr. Alan Stone); *A. tanycerus* (O. S.) (genotype of *Assipala* n. gen.) 3 ♀, Costa Rica; *A. ceras* (Twins.), cotype ♀ from the British Museum; and *A. megaceras*, ♂ from Mexico (Bigot Collection).

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### Fünf neue neotropische Fruchtfliegen (Dipt.)

von F. M. Hering, Zoologisches Museum, Berlin

(Mit 6 Abbildungen)

(37. Beitrag zur Kenntnis der Trypetidae)

In einer mir vom Ungarischen National-Museum (Budapest) zugegangenen Bestimmungssendung fanden sich die nachfolgend neu zu beschreibenden Fruchtfliegen-Arten. Ich spreche auch hiermit Herrn Dr. A. Soós (Budapest) meinen herzlichen Dank für die Zugänglichmachung des interessanten Materials aus. Bemerkenswert in dem Material ist einmal die Auffindung einer neuen *Euribia*-Art. Diese Gattung, die in der Palaearctis in sehr zahlreichen Arten auftritt, ist erst in sehr wenigen Arten in letzter Zeit aus der Neotropis bekannt geworden, es ist aber anzunehmen, dass auch hier noch viele weitere Arten entdeckt werden können. Von besonderem Interesse ist aber die Entdeckung der neuen Gattung *Gerrhoceras*, die schon rein habituell einen recht fremdartigen Eindruck erweckt und morphologisch durch die zapfenartigen Fortsätze des Scutellums eine recht isolierte Stellung einnimmt.

#### *Gerrhoceras*, gen. nov.

Die neue Gattung gehört zu den echten Trypetinae und ist unter diesen besonders durch die sehr hohen Backen und die Schildchen-Fortsätze ausgezeichnet. Alle Borsten des Körpers sind hellgelb, die Haare dagegen sind schwarz.

Kopf in Seitenansicht an der Fühlerwurzel stark, um die halbe Höhe des senkrechten Augendurchmessers, vorspringend; die Backen sind etwa so hoch wie dieser. Das Praelabrum ist deutlich sichtbar und vorspringend, aber häutig gefaltet. Rüssel stempelförmig, die Palpen breit löffelförmig. Fühler kurz, den Mundrand nicht erreichend, das 3. Glied kurz und eiförmig,

vom vergrösserten 2. Gliede kappenartig basal überwölbt, am meisten an der Innenseite. Das 2. Glied ist innen dicht behaart, dorsal mit einem Börstchen. Auf der Oberseite des 3. Gliedes stehen einige wenige längere Haare anstatt der gewöhnlichen Pubescenz. Die Arista ist ganz nackt und nur im verdickten, basalen Drittel ganz schwach pubescent. Die Fühler sind entfernt eingelenkt; zwischen sie reicht noch der wenig abgehobene, breite und flache Mittelkiel des Gesichtes. Der Mundrand springt kaum vor. Hinterkopf sehr stark gepolstert, schon ziemlich hoch beginnend. *vti* und *vte* sind mässig lang, kaum in der Länge verschieden, 2 *ors* und ebenso starke *oc* und 3 *ori* sind vorhanden.

Thorax mit vollständiger Beborstung, indessen waren die *scap* nicht sicher festzustellen. Vorhanden sind *prscut*, 2 + 1 *sa*, *dc* hinter der Querlinie der vorderen *sa* stehend, *hum*, *prscut*, 2 *ntpl*, 2 *mpl* (darunter einige längere schwarze Haare), *stpl* (und eine schwarze *ptpl*). Schildchen mit 4 *sc*, oberhalb der apicalen (weiter getrennt als diese) 2 zapfenartige Vorsprünge (Abb. 2), die am Ende stärker chitinisiert sind. Das Pleurotergit ist nicht behaart. Macrochaeten auf den Abdominaltergiten fehlen ganz. Die Beine sind schwarz behaart, ohne stärkere Borsten; solche fehlen auch an der oberen und unteren Aussenseite der *f*<sub>1</sub>. Die Hinterschienen tragen ebenfalls keine Borstenreihe. Der Sporn am Ende der *t*<sub>2</sub> ist kaum ausgeprägt und viel kürzer als die halbe Dicke der Tibia.

Im Flügel ist *r*<sub>1</sub> durchlaufend gleichmässig bis zum *th* beborstet, *r*<sub>4+5</sub> ist sehr fein und schütter behaart, oben bis jenseits, unten bis etwa zum *ta*. Der *r*<sub>2+3</sub> ist etwas wellig, der *ta* steht jenseits der Mitte der *Ct*, vom *tp* etwa um dessen Länge entfernt. Der Zipfel der *Can* ist kürzer als die *Cb*<sub>2</sub>.

Generotypus die folgende neue Art:

*Gerrhoceras paradoxa*, spec. nov. (Abb. 1, 2)

Kopf rotbraun, das Untergesicht wie auch der grösste Teil des Hinterkopfes schwärzlich. Die Stirnstrieme in der Hälfte (mit Abzweigungen an den Seiten des Ocellar-dreiecks vorbei) samtschwarz. Fühler schwarzgrau, das dritte Glied aber gelb, so auch der verdickte Teil der Arista. Thorax rotgelb, mit einem breiten, schwarzen Streifenpaar; jeder Streifen ist innen von der *dc*, aussen von der *prscut* begrenzt, in der Naht eingeschnürt, hinter ihr schmaler, den Hinterrand



des Mesonotums nicht erreichend, am Vorderrand undeutlich fortgesetzt. Die Brustseiten sind schwarz, nach oben hinaufreichend bis zum Unterrand des Humeralcallus, teilweise auf den Notopleuralkallus und bis zu den *sa*. Beide Schüppchen sind bandartig breit und schwarz gewimpert. Halteren gelb, ihr Knopf schwarz. Beine gelb, die  $f_1$  ganz, die übrigen Schenkel in den basalen  $\frac{2}{3}$  und die Aussenhälfte der Schienen pechbraun. Mesophragma und Postscutellum schwarz. Abdomen rotgelb, das 1. Tergit schwarz, die übrigen Tergite mit sehr feinen, schwarzen Hinterrändern, die dorso-central etwas verbreitert sind.

Flügelwurzel gelb bis zur *m*, nach aussen bis zur Mündung von  $r_1$  reichend, in *Cm* und *Csm* etwa ebenso breit. *Cb*<sub>1</sub> ganz gelb. *Cb*<sub>2</sub> und *Can* central gelb, im übrigen die Wurzel unterhalb der *m* braun bis an die Basis der *Cd*, *Cp*<sub>3</sub> und den grössten Teil des Schulterlappens. Die Apicalhälfte ist von *ta* an braun, in *Csm* und der oberen Hälfte von *Cp*<sub>1</sub> gelblich aufgehellt. *Cp*<sub>2</sub> mit einem breiten, hyalinen Randeinschnitt, der fast den ganzen Hinterrand einnimmt. Im Schulterlappen, der Alula und im Braun des distalen Flügelteiles finden sich einige, zum Teil nur trüb-hyaline, sehr kleine Glaspunkte. Flügellänge 13 mm.

♂. — Type von Coroica, Bolivia, im Ungarischen National-Museum in Budapest.

*Tetreuaresta punctipennata*, spec. nov. (Abb. 3)

Alle Borsten des Körpers sind gelb, an der Basis kurz schwarz. Kopf gelb, mit  $2+3$  *or*, Stirn nackt, *oc* stark, Arista nackt wie auch die Stirnstrieme. Das Untergesicht ist fast weisslich. Thorax grau, mit etwas gelblichem Tone, Pubescenz gelb. Der Humeralcallus erscheint etwas blasser gelb. Die *dc* steht knapp hinter der Suture. Schüppchen breit, das untere vorragend, beide weisslich gewimpert. Mesophragma und Postscutellum schwarz, etwas grau bestäubt. Schildchen (von hinten gesehen) am Ende gelb, mit 2 schwarzen seitlichen Flecken, die die apicalen *sc* nicht erreichen. Abdomen schwarz, schwach glänzend, das 2. Tergit mit breit gelbem Hinterrand, der dorsocentral erweitert ist, die übrigen Tergite mit gelber Mittellinie. Basalglied des Ovipositors schwarz, dunkel behaart, etwas länger als die letzten 2 Tergite zusammen.

Im Flügel  $r_1$  durchlaufend bis *th* beborstet. Der  $r_{4+5}$  oben bis fast zum Ende, unten bis jenseits *ta* beborstet. Der

Vorderrand ist stark convex, *Csc* und  *Cm* sind sehr breit. *Cc*<sub>2</sub> mit 3 braunen Querbändchen, *Csc* nur einen kleinen Glaspunkt enthaltend.  *Cm* mit 2 hyalinen Randeinschnitten dicht nebeneinander, der basale in einen Glaspunkt in *Csm* fortgesetzt, ausserdem ein hyaliner Tropfen am Ende. *Csm* mit 2 grossen Randtropfen und weiteren 4 Glaspunkten im

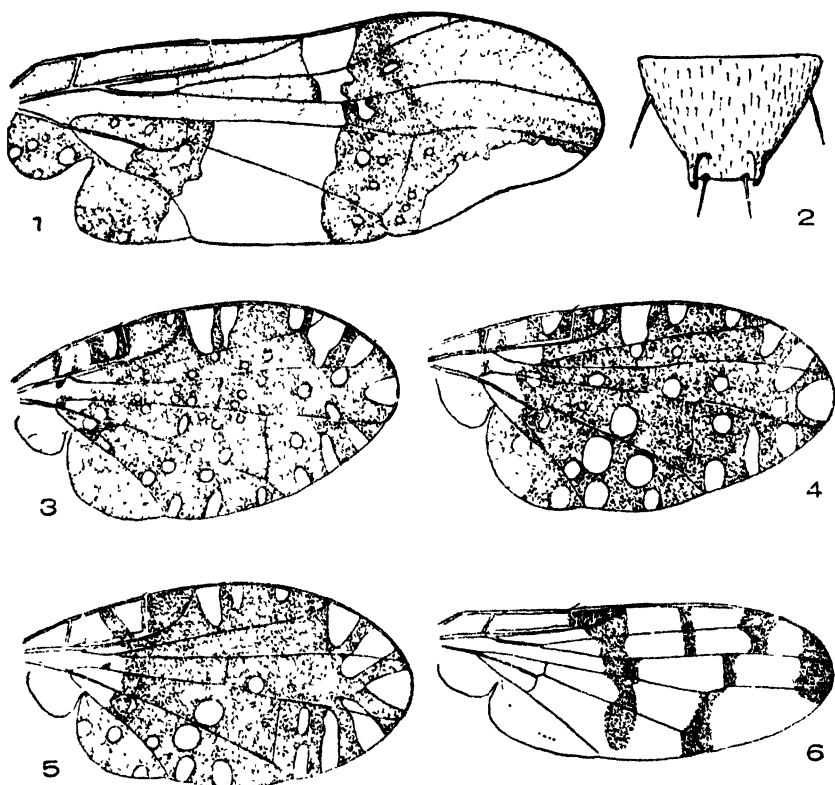


Abb. 1. *Gerrhoceras paradoxa* Hering, Flügel. — Abb. 2. *Gerrhoceras paradoxa* Hering, Scutellum. — Abb. 3. *Tetrenaresta punctipennata* Hering, Flügel. — Abb. 4. *Tetrenaresta lata* Hering, Flügel. — Abb. 5. *Tetrenaresta deleta* Hering, Flügel. — Abb. 6. *Euribia aerea* Hering, Flügel.

Innern. *Cp*<sub>1</sub> mit grossem Mündungsfleck, der die begrenzenden Adern nicht erreicht, und 6-7 Glaspunkten im Innern. *Cb*<sub>1</sub> mit 4 Paaren von Glaspunkten, in *Cd* deren etwa 10 vorhanden. *Cp*<sub>2</sub> mit 3 hyalinen Randeinschnitten und 1 Tropfen im Innern. *Cp*<sub>3</sub> mit 3 Randtropfen und 2 Tropfen im Innern, Schulterlappen mit 4 Randtropfen und 2 solchen im Innern. *Cb*<sub>2</sub> und *Can* mit centralem hyalinen Fleck, Flügelwurzel hyalin. Flügel-länge 4 mm.

♀. — Type von Costa Rica, Suiza de Turrialba, im Ungarischen Nationalmuseum.

Die Art steht am nächsten *T. ellipta* (Hendel), mit der sie zusammen ausgezeichnet ist durch die vielen kleinen, hyalinen Punkte in der Mitte des Flügels. In Gegensatz zu der Art von Hendel ist hier aber an der *Csm* der basale hyaline Einschnitt viel grösser als der distale, die braunen Spitzenstrahlen sind durchweg breiter, nicht nur am Ende verbreitert, im Innern des Flügels sind in *Cp*<sub>1</sub>, *Cd*, *Cb*<sub>1</sub> und *Csm* viel zahlreichere kleine Glaspunkte vorhanden, während grosse hyaline Tropfen dort fehlen.

*Tetreuaresta lata*, spec. nov. (Abb. 4)

Morphologisch mit der vorigen Art im wesentlichen übereinstimmend. Kopf gelb, der Hinterkopf mit centralem, nicht sehr ausgedehntem, schwarzem Fleck. Abdomen schwärzlich, etwas glänzend, nur die basalen 3 Segmente an den Seiten gelb. Beine gelb. Thorax wie bei voriger Art.

Im Flügel liegen in *Cm* die beiden basalen hyalinen Randeinschnitte nicht so dicht aneinander, sie sind breiter, und der mittlere der drei erreicht nicht den  $r_{2+3}$ , der basale ist in *Csm* fortgesetzt. Im Gegensatz zur vorigen Art ist an der Mündung der *Csm* der basale hyaline Einschnitt kleiner als der distale; im Innern dieser Zelle liegt ausserdem noch ein hyaliner Tropfen. Der hyaline Mündungstropfen der *Cp*<sub>1</sub> ist breiter, basal davon liegt vor ihm ein Paar hyaliner Tropfen und je ein solcher Tropfen vor und hinter dem *tp*. *Cb*<sub>1</sub> nur mit einem hyalinen Tropfen, auch in *Cd* nur ein grosser Tropfen. *Cp*<sub>3</sub> mit 2 hyalinen Randtropfen und 2 sehr grossen und 1 kleinen im Innern. Flügellänge 4,8 mm.

♂. — Type von Paraguay, Asuncion, leg. Vezényi 1904, im Ungarischen National-Museum.

*Tetreuaresta deleta*, spec. nov. (Abb. 5)

Morphologisch stimmt diese Art ebenfalls mit den beiden vorangegangenen überein. Der Thoraxrücken ist dunkler grau, das Abdomen schwarz, bis zur Mitte des 3. Tergites gelb, auch das 4. Tergit am Vorderrande noch mit gelben Seitenflecken.

Im Flügel die *Cc*<sub>2</sub> nur mit deutlichem braunen Mittelbändchen, das basale undeutlich, das distale nur ganz schmal strichartig und wenig deutlich. Die *Csc* ist ganz schwarz, ohne hyalinen Tropfen. Die 3 hyalinen Randeinschnitte der *Cm* sind sehr klein, auch der grösste, basale, erreicht nicht ganz den  $r_{8+2}$ , der folgende ist ihm genähert, reicht etwa bis

zur Mitte der *Cm*, der letzte ist noch kleiner. Die beiden hyalinen Einschnitte an der Mündung der *Csm* sind etwa gleichgross, sonst ist in *Csm* überhaupt kein weiterer hyaliner Tropfen mehr vorhanden. Der Mündungseinschnitt der *Cp*<sub>1</sub> ist etwas zugespitzt, basal davon 2 hyaline Tropfen, dann nur noch einer zwischen *ta* und *tp*. Die *Cb*<sub>1</sub> ist ganz dunkel; die *Cd* enthält einen grossen hyalinen Tropfen, die *Cp*<sub>3</sub> 3 hyaline Randeinschnitte und 2 Tropfen im Innern, der Schulterlappen 3 am Rande und 1 im Innern. Wurzel des Flügels hyalin. Flügellänge 3,2 mm.

♂ -- Type von Pernambuco, leg. Horváth 1930, im Ungarischen National-Museum.

Während die vorige Art in den meisten Merkmalen mit *T. angustipennis* (Wulp) übereinstimmt und sich durch breitere Flügel und nur 1 hyalinen Tropfen der *Cd* auszeichnet, steht *T. deleta* m. in allen Merkmalen, auch in der geringen Grösse, zunächst *T. obscuriventris* (Loew), einer in Südamerika weit verbreiteten und häufigen Art. Bei der neuen Art fehlen aber die hyalinen Tropfen in *Csc* und *Cb*<sub>1</sub>, und im Innern der *Cp*<sub>2</sub> sind nur 2 hyaline Tropfen distal von der Analis vorhanden.

### *Euribia aerea*, spec. nov. (Abb. 6)

Unter den Arten mit ganz schwarzem Scutellum steht diese neue Art durch die Flügelzeichnung *E. grindeliae* Coquillett, 1908 am nächsten. Von dieser von Texas beschriebenen Art unterscheidet sich die neue durch eine ausgedehntere Flügelzeichnung. Hier ist namentlich die ganze *Csc* braun, die Enden der 3. und 4. Langsader werden von einem gemeinsamen, braunen Fleck bedeckt, der *tp* ist viel breiter dunkel gesäumt.

Kopf und seine Anhänge gelb, die Stirn an der Fühlerwurzel um 1/3 der Breite des 3. Fühlergliedes vorspringend. Die Backen sind so hoch wie das 3. Fühlerglied breit, der Mundrand kaum merklich aufgeworfen. Borsten schwarz: 1 + 2 *or* in etwa gleichen Abständen, vorderste *ori* näher der Fühlerwurzel als der oberen *ori*. Thorax schwarz, Rücken matt grau bestäubt; Pubescenz schwarz, Beborstung normal, die *dc* in der Querlinie der vorderen *sz*. Die inneren *scap* sind länger als die äusseren. Schüppchen braun gewimpert; Schildchen schwarz, ohne jede gelbe Zeichnung. Abdomen glänzend grünschwartz, schwarz behaart. Ovipositorbasalglied etwas länger als die letzten beiden Tergite zusammen. Hüften, Schenkel (ausgenommen die Knie) und die basalen 1/3 der *t*<sub>3</sub> schwarz, Beine sonst gelb.

Im hyalinen Flügel ist *Csc* ganz schwarz; von dort geht eine in der Breite unregelmässige schwarze Querbinde über *cu* hinaus bis zur Längsfalte der *Cp*<sub>3</sub>; aus der Mitte der *Cm* geht ein brauner Querstrich bis *r*<sub>+5</sub>; das Ende der *Cm* ist braun, darunter schmaler verlängert bis *r*<sub>4+5</sub>, dann weiter, wurzelwärts verschoben, als Querband der *Cp*<sub>3</sub> und endlich in die Säumung des *tp* fortgesetzt, die am Hinterrande am breitesten ist. Von der Mitte der *Csm* bis in die *Cp*<sub>2</sub> hinein reicht ein grosser, innen etwas unregelmässig begrenzter Apicalfleck. Flügellänge 2,7 mm.

♂ — Type von Costa Rica, Suiza de Turrialba, im Ungarischen National-Museum.

#### **Cuterebrineo novo parasita de Didelfideo (Diptera, Oestridae)**

por Flávio da Fonseca, Instituto de Butantan, São Paulo

(Com 1 figura no texto e 2 estampas)

Quando, em 1931, Arminius Bau (1) desmembrou do subgênero *Metacuterebra* Bau, 1929 (2) o então novo subgênero *Oricuterebra* Bau, 1931, depois elevado à categoria genérica por Townsend (3), escolheu para genotipo *Oricuterebra sarcophagoides* (Lutz, 1917) (4). Nesta espécie os caracteres atribuídos por Bau ao novo subgênero são todos muito nítidos e a diagnose pode a qualquer tempo ser estabelecida sem dificuldade, o que também deve ser o caso para *Oricuterebra megastoma* (Brauer), que Bau inclui com segurança no mesmo subgênero. Já em relação à espécie *patagona* de Guérin, da qual não dispunha de exemplar para exame, limita-se Bau a dizer que provavelmente também deverá ser *Oricuterebra*, deixando interrogada a possibilidade da inclusão de *detrudator* Clark e de *nigricincta* Austen no mesmo subgênero.

Em 1940 tive ocasião de descrever uma nova espécie, *Oricuterebra bauri* Fons. (5), baseado em um único exemplar fêmea capturado em Butantan, S. Paulo, Brasil, a qual passou a ser a terceira espécie do gênero. Para incluí-la em *Oricuterebra*, entretanto, foi já necessário dar a este gênero maior amplitude, eliminando da diagnose por demais restrita de Bau os caracteres cromáticos, bem como o da conformação da fossa antenal, admitindo, outrossim, que a projeção do vertex e a saliência dos olhos (est. 20, fig. 1) não precisam ser tão acen-

tuados como na espécie tipo, nem tão arrebitado o rebordo oral (estampa 20, fig. 2). Em resumo, *Oricuterebra baui* representa um tipo intermediário entre os gêneros *Oricuterebra* e *Metacuterebra*.

Disponho agora de um novo exemplar de *Cuterebrini*, desta vez um macho, espécime único, cujos caracteres ainda mais se afastam dos da espécie tipo, deixando-me em dificuldades quanto a sua correta determinação genérica.

Os caracteres da arista, pilosa apenas no bordo superior, afastam-se dos gêneros *Rogenhoferia*, *Guerinioestrus*, *Atrypoderma*, *Bogeria*, *Cuterebra* e *Pseudobogeria*. Por outro lado, a ausência de calos faciais (fig. 1; est. 20, fig. 1) fazem-no divergir dos gêneros *Metacuterebra* e *Oricuterebra*, aproximando-o mais de *Atrypoderma* ou de *Paracuterebra* (*sensu* Bau = *Cuterebra sensu* Townsend), semelhança esta ainda mais acentuada pela coloração negra da face, só assinalada nestes dois gêneros de *Cuterebrini*. Os caracteres da arista, entretanto, só permitiam inclusão em *Metacuterebra* ou *Oricuterebra*, restando saber si tais caracteres deverão ou não prevalecer sobre os faciais, i. é., ausência de calos em uma face negra.

Como fosse pequena a minha experiência na tribu *Cuterebrini*, da qual apenas examinei pessoalmente até hoje meia dúzia de espécies, resolvi aproveitar a amabilidade e o grande conhecimento de Charles Townsend, domiciliado em seu retiro de Itaquaquecetuba, muito próximo de S. Paulo, aonde levei o novo exemplar, bem como o holotipo de *Oricuterebra baui* Fons.

Depois de examinar ambos concluiu Townsend que também o novo exemplar era um representante do gênero *Oricuterebra* Bau, não sendo mesmo impossível que se tratasse do macho de *Oricuterebra baui* Fons.

E' baseado na opinião de tão grande autoridade em Oestromuscóideos que conservo a espécie abaixo descrita no gênero *Oricuterebra* Bau. De fato, a diagnose de *Oricuterebra* é essencialmente baseada na angulosidade do perfil oro-facial, no abaulamento do vertex e na concavidade do perfil facial. Ora, o perfil oro-facial no novo exemplar está longe de ser anguloso (comparem-se a estampa 20, fig. 2 e est. 21, fig. 2 com a fotografia 2 de Bau (1)) como em *Oricuterebra sarcophagoides*; o vertex forma com os olhos um mesmo arco de círculo, não havendo abaulamento e sendo até menos saliente do que em várias espécies de *Metacuterebra* por mim exami-

nadas (est. 20, fig. 1); além disso, o perfil da face é apenas levemente côncavo (est. 20, fig. 2; est. 21, fig. 2).

A identidade do novo exemplar com *Oricuterebra baui* Fonseca, questão deixada em aberto por Townsend ao examinar os dois holotipos, só poderá, a meu ver, ser definitivamente resolvida no dia em que forem obtidos de um mesmo hospedeiro exemplares ♂♂ e ♀♀ ou ainda melhor quando fôr conseguida uma cultura. Para firmar no momento a identidade das duas espécies será necessário admitir um dimorfismo sexual tão acentuado como não sei si ocorrerá em alguns *Cuterebrini*; é o que se verifica no quadro abaixo em que apresento as principais diferenças entre a ♀ holotipo de *O. baui* e o ♂ holotipo da nova espécie.

*Oricuterebra baui* Fons.    *Oricuterebra townsendi*, sp.n.

Comprimento	20 mm exclusive as azas	14 mm exclusive as azas
Vertex	Ligeiramente proeminente, castanho escuro	Não proeminente, de côr negra retinta
Olhos	Pouco desviados do perfil do vertex	Formando com o vertex uma mesma linha
Face	Amarelo dourada com 3 callos	Negra e sem calos
Mesonoto	Com estriação nítida, polinosidade cinza acentuada, com pilosidade dos bordos amarela e sem tufos amarelos paramedianos anteriores	Com estriação muito pouco perceptível, polinosidade cinza muito pouco visível, com pilosidade dos bordos alaranjada ou fulva e tufos paramedianos anteriores da mesma côr
Escutelo	Subtriangular, com pilosidade amarela nos bordos	De bordo posterior arredondado, com pilosidade fulva nos bordos
Pleuras	Com 5 pontos negros em fundo amarelo	Com 1 só ponto negro em fundo côr de laranja escuro
Abdômen	Com reflexo esverdeado metálico, sem faixas douradas contrastando com o fundo	Com reflexo azul metálico e faixa dourada basal no 3.º e 4.º tergitos
Fêmur e tíbias	Com manchas amarelas em fundo negro	Negros, sem manchas
Azas	Metade anterior não mais escura	Metade anterior mais escura
Esquama	Amarelada	Quasi negra

*Oricuterebra townsendi*, sp. n.

## Descrição do holotipo ♂

**Dimensões:** Comprimento total, exclusive as azas, 14 mm, incluindo as azas, 17 mm. Maior largura da cabeça 6 mm; altura da cabeça do triângulo ocelar à gena 4 mm. Distância mínima entre os olhos 2 mm. Comprimento da fronte (fossa antenal) 1,5 mm; largura da fronte 1,7 mm. Largura do tórax ao nível da inserção das azas 6 mm. Largura máxima do abdômen 6,5 mm. Comprimento da aza 12 mm.

**Aspecto geral:** Díptero de pequenas dimensões para o grupo, ainda menor do que *Metacuterebra pygmaea* Bau, de coloração geral negra, intensa e brilhante, com áreas alaran-

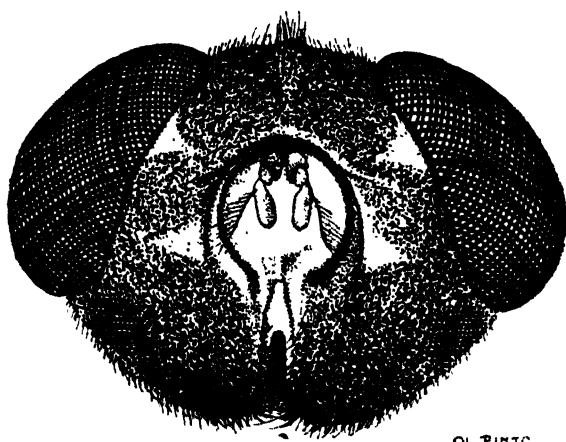


Fig. 1. *Oricuterebra townsendi* n. sp., cabeça, vista de frente.

jadas, quasi côr de fogo no tórax e no abdômen. A largura da cabeça, tórax e abdomen é quasi a mesma, o que lhe confere aspecto roliço quando examinado de cima.

**Cabeça:** O vértex (*frontalia* + *parafrentalia* de Townsend) não apresenta a protusão característica de *Oricuterebra sarcophagoides* e ainda esboçada em *Oricuterebra baui* (est. 20, fig. 1), parecendo que êste carater não mais deva figurar como obrigatório na diagnose genérica. Examinado pela face dorsal, os contornos dos olhos e do vértex formam praticamente um arco de círculo. O vértex é negro e apresenta polinósidade cinzento-prateada sob a forma de duas largas faixas situadas entre os olhos e o triângulo ocelar e visíveis a um exame em direção antero-posterior. E' recoberto de cerdas ne-



gras, inclinadas para dentro. Na base do vértex encontra-se o triângulo ocelar, elevado e com duas zonas distintas: posterior, alargada e rugosa, com cerdas negras e eretas, e anterior, estreitada, glabra e lúidia, avançando até o meio da distância que vai até o *ptilineum*. Limitando estas duas zonas está o único ocelo, mais largo do que longo, lembrando um topázio engastado, pouco saliente e de superfície rugosa e brilhante. A conformação do triângulo ocelar, dividido em zona posterior pilosa e anterior lisa, e a existência de um único ocelo são pontos de contato com *O. baui*, na qual o aspecto é semelhante. Chamo a atenção para este fato porque em *O. sarco-phagoides* (Lutz), segundo o magnífico desenho de Fischer (4) há três ocelos.

Face (*parafacialia* de Townsend) negra retinta com duas manchas douradas que após a morte, devido ao fenômeno da decomposição, desapareceram. A primeira dessas manchas douradas é triangular, situada no nível da base das antenas, ocupando a metade da largura que vai do rebordo ocular à sutura ptilineal, de base voltada para o ôlho e prolongada em curta extensão para cima e para trás sob a forma de faixa que se afila gradativamente. Sobre essa área e a zona adjacente o exame com forte aumento, sob luz artificial dirigida tangencialmente à inserção das cerdas, revela serem estas de coloração dourada. Uma segunda mancha dourada, maior, mais pálida, também triangular, porém de posição inversa, i. é., com a base encostada à sutura ptilineal, é encontrada entre a extremidade apical da antena e o ângulo central da fossa antenal. Esta mancha ocupa cerca de  $\frac{2}{3}$  da área que vai do extremo do ramo da sutura ptilineal ao ôlho, prolongando-se para cima sob a forma de estreita faixa que margeia o bordo da sutura citada; ao contrário da mancha dourada precedente, a sua superfície é glabra. A restante superfície da face é negra como ébano e, apesar de rugosa ou profundamente pontuada, é quase sempre brilhante, só em raras zonas de conformação irregular, como ao nível do ângulo infero-interno do ôlho, apresenta-se mais lisa. Não se vê, entretanto, área alguma em que a diferenciação do tegumento permita suspeitar a existência de calos faciais. Como já ficou dito, a coloração dourada das manchas, visível no exemplar vivo e logo após a sua morte, desapareceu, conservando-se apenas a coloração dourada das cerdas da mancha mais dorsal. No desenho (fig. 1) estas manchas estão representadas em coloração mais clara, tendo sido

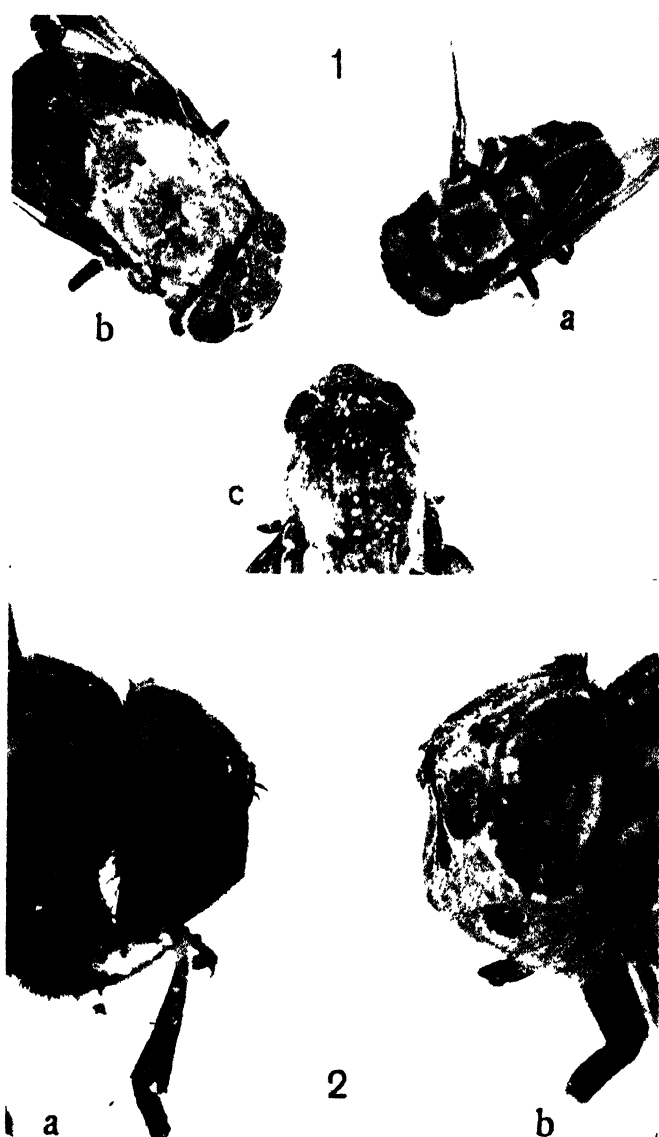


Fig. 1, a) *Orienterebra toussendi* n. sp., holotipo, b) *Orienterebra bauri* Fonseca, holotipo, c) *Metacuterebra apicalis* (Guérin). — Fig. 2 Perfil da cabeça dos holotipos de (a) *Orienterebra toussendi* n. sp. e (b) *O. bauri* Fonseca.

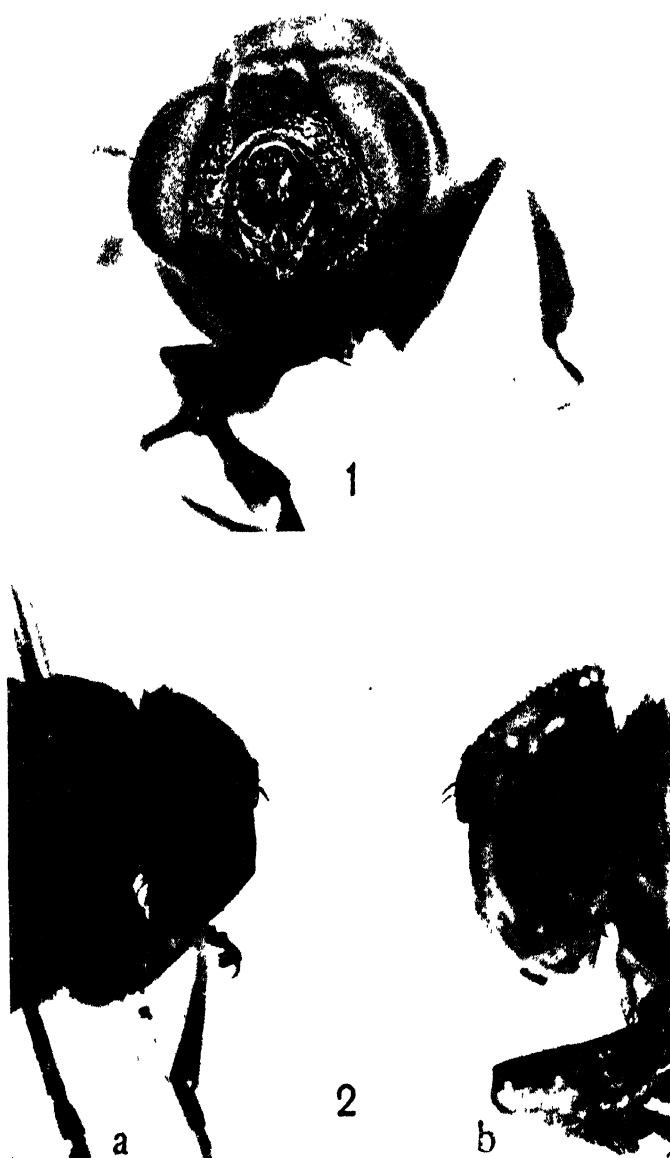


Fig. 1. *Oreocuterebra townsendi* n. sp., holotipo. Fig. 2. Perfil da cabeça do holotipo e (a) *Oreocuterebra townsendi* n. sp. e (b) de um exemplar de *Metacuterebra apicalis* (Guerin)

reproduzidas segundo a descrição, pois já não se viam mais no exemplar. A face e o rebordo oral apresentam pilosidade esparsa, curta e negra. As genas são negras, exceto na região limítrofe com o *gulummentum*, onde apresentam coloração dourada e cêrdas longas de côr alaranjada.

Perfil facial apenas levemente côncavo, ao contrário do que sucede a outras espécies do gênero, notando-se a mesma discordância em relação ao perfil oro-facial, que está longe de ser tão anguloso como na espécie tipo.

Lúnula negra e brilhante. Sutura ptilineal parecendo emitir dois ramos em direção ao meio dos olhos, na altura da base do 3.<sup>o</sup> artículo da antena.

Facialia de côr negra luzidia e glabra até o meio da altura da fossa antenal, tornando-se depois menos brilhante e apresentando algumas cerdas negras para em seguida alargar-se e tornar-se de novo brilhante, apresentando aí cerdas mais longas já na altura do epistoma.

Fossa antenal (clípeo de Townsend) de fundo negro e polinosidade cinza. E' aveludada e apresenta uma linha mediana e duas outras sub-medianas, as quais, partindo do limite com o epistoma, divergem para cima até a base das antenas, incluindo uma zona de polinosidade mais clara. As antenas têm um primeiro artículo negro com pilosidade dourada; um segundo artículo negro acinzentado com tufo formado por poucas cerdas douradas e um terceiro artículo de côr cinza levemente dourada. Na base dêste artículo acha-se implantada a arista, que no holotipo apresenta 12 pêlos dorsais, incluindo o apical, não havendo pêlos no bordo vertical. O terceiro artículo ultrapassa de pouco o meio da fossa antenal, sendo a arista, excluído o pêlo apical, um pouco menor do que êsse artículo.

Tórax — Mesonoto, visto a ôlho nú e à luz natural, negro levemente azulado, às vezes com reflexo acinzentado, com sutura completa e cinco faixas negras no *pre-scutum*, das quais a mediana, mais estreita, atinge a margem anterior do escutelo, interrompendo-se as outras ao nível da sutura do mesonoto, sendo as externas mais longas. A pilosidade, só visível ao microscópio, é constituída por pêlos negros e curtos em quasi toda a extensão; no bordo anterior são encontrados pêlos longos de côr alaranjada ou fulva, formando dois tufos ralos dos lados da linha mediana, observando-se pilosidade alaranjada abundante nos bordos laterais, do limite com o terço an-

terior para trás. O escutelo é negro e apresenta os mesmos pelos negros encontrados no mesonoto; o seu bordo posterior, em vez de ser anguloso como em *Oricuterebra baui*, é ao contrário quasi reto, sendo margeado por abundante pilosidade fulva. Pleuras com abundante pilosidade da mesma côr descendo até a base das coxas, predominando a pilosidade negra só na propleura e pteropleura. A hipopleura é praticamente glabra e negra. Próximo do bordo dorsal da mesopleura há uma mancha negra que, vista a olho nú, é muito nítida e constitui a única mancha semelhante às habitualmente encontradas em outras espécies.

Azas recobertas por microtríquia negra e enfumaçada desde o rebordo costal até atrás da nervura  $M_1$ ; álula mais escura. Esquama e antesquama negras.

Patas negras, com alguma polinosidade cinza na zona basal das tíbias e um pouco menor na face dorsal dos fêmures. Só os *pulvilli* são alaranjados, da côr dos pêlos fulvos do tórax.

Abdômen. — A coloração do fundo é negra brilhante com reflexo metálico, sendo muito nítidas duas faixas douradas, interrompidas na linha mediana do 3.º e 4.º tergitos, existindo também cerdas douradas na base do 2.º e do 5.º tergitos. Examinado por trás, o abdômen mostra polinosidade cinza, vendo-se com pequeno aumento, lateralmente, tufo de pêlos curtos como que dispostos em ilhotas sobre um fundo pardo. A pilosidade, tanto a dourada quanto a negra, é mais longa na extremidade ventral dos tergitos.

Descrição feita do holotipo ♂ N.º 3745 de minha coleção, no Instituto Butantan, exemplar único obtido por cultura de tres larvas encontradas em parasitismo sobre o menor dos Didelfídeos, *Marmosa microtarsus microtarsus* (Wagner), capturado em Butantan, S. Paulo, a 16.V.40.

A espécie é dedicada ao notavel dipterologista Charles Townsend, grande estudioso deste grupo, o qual teve a bondade de examinar o holotipo e dar sua opinião sobre a posição genérica.

Agradeço ao dr. Oliverio Pinto, Diretor do Departamento de Zoologia, a determinação do hospedeiro.

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**Nuevas especies de Mydidae de Chile (Diptera)**

por el Dr. Edwyn P. Reed (Valparaiso) i el Professor Flaminio Ruiz P. (Santiago, Chile)

En la Revista Chilena de Historia Natural, tomo XLII, año 1938, se publica un trabajo de E. Séguy del Museo de Historia Natural de Paris sobre Midaidos de Chile.

Este estudio revela novedades de importancia, ademas de una tabla para la determinacion de los jeneros de los cuales seis solamente estan representados en Chile.

El genero *Midacritus* es nuevo i su autor lo caracteriza asi: «Proboscis exigua, margine orali non producta. Antennae breviores, in utroque sexu simillimae. Alae nervis R5 et MA 1a usque ad apicem validus; Cu 1a ad marginem prolongatus. Squama inferior angusta, ciliata. Tibia III inermis.»

La caracterizacion es mui clara i ademas de la especie descrita por Séguy hemos encontrado otra que describimos en este trabajo.

Refiriendose a la sinonimia que han hecho notar algunos autores entre el jenero *Rhopalia* Macquart i *Apiophora* Philippi, dice Séguy que un caracter especifico sirve para rechazarla porque no es tal, pues el jenero de Philippi presenta una nerviacion perfectamente distinta: «Alae nervulo transverso in medio marginis postice munitae. No se puede confundir otro jenero con este que lleva el nervio transverso en el margen posterior del ala. Debe por lo tanto conservarse el jenero *Apiophora* Philippi.

Los jeneros de los cuales hasta ahora no se han encontrado representantes en Chile son: *Lampromydas* Séguy de Mejico; *Phyllomydas* Bigot de America Central; cada uno de estos jeneros esta representado por una especie; el jenero *Nomoneura* Bezzi, con siete especies, cinco del Africa, una de la India i otra de America Central.

Los jeneros chilenos son: *Dolychogaster* Macquart, con una especie, *D. nigricornis* Phil. De esta especie no se conocia la hembra i al revisar la coleccion Reed nos cupo la suerte de encontrar una que describimos mas adelante. El jenero *Apiophora* Phil., tiene dos especies, *A. paulseni* Phil. i *A. elvirae* Reed & Ruiz. El jenero *Mydas* Fabricius con una de las mas grandes i hermosas de los Midaidos chilenos, la *Mydas apicalis* Wied. El jenero *Ectyphus* Gerstaecker con

la especie *Ectyphus rubrocinctus* Blanch. El jenero *Midacritus* Séguy con las especies *M. stuardoanus* Séguy i *M. wagenknechti* Reed & Ruiz. El jenero *Mitrodetus* Gerst. con las especies *M. dentitarsis* Macq., *dimidiatus* Phil., *leucotricus* Phil., *thereviformis* Séguy i las nuevas especies que describimos mas adelante: *chilensis* Reed & Ruiz; *matthaei* Reed & Ruiz i *reedi* Reed & Ruiz.

Ademas de las nuevas especies que se describen de la entomofauna chilena, se da la descripcion de la hembra de *Dolychogaster nigricornis* Phil. que no estaba descrita i que presenta un notable dimorfismo sexual.

En resumen los Midaidos de Chile hasta hoi estan representados por 14 especies.

Por su morfologia esta familia de Dipteros tiene su colocacion natural cerca de los Asilidos i de los Apioceridos, con los cuales se enlazan por su parecido; ademas por la nerviacion presentan cierta semejanza con los Nemestrinidos. Los Midaidos forman un grupo de hermosos dipteros i entre ellos se encuentran las especies mas grandes que existen, tales como el *Mydas heros* de 55 milimetros.

Su representacion en Chile es bastante numerosa i mui probablemente han de quedar especies aun no conocidas. En Chile la de mayor tamaño entre las descritas es la *Mydas apicalis* Wied.

Estas moscas fueron consideradas como habitantes de los tropicos, aunque se conocian representantes de España, Portugal i Sicilia.

De la biologia en las especies chilenas solo se sabe que son parasitas, pero se ignora cuales sean sus huespedes; los imagos son predadores como los asilidos, sus proximos parientes.

### *Dolychogaster nigricornis* Phil. ♀♂

Hembra: cabeza, torax i abdomen negros; tanto la parte dorsal como la ventral del insecto son completamente glabras. Cabeza, frente i parte posterior con escasos pelos negros tiezos. El primer articulo de las antenas cilindrico i con escasos pelos negros tiezos; el ultimo articulo es de forma ovoidea desprovisto de pilosidad. Torax liso; a los lados con escasos pelos negros, ralos, con dos callosidades en la rejion humeral del torax mui manifestas; escutelo con pelos negros en su parte inferior. Abdomen angostado en su base se en-

sancha paulatinamente i vuelve a angostarse despues lo que le da forma eliptica. El primer anillo con escasos i cortos pelos negros hacia los lados. Alas bastante ahumadas con nerviacion rojo-amarillenta en la base i blanco-amarillenta en el resto.

Patas, coxas i trocanteres negros; muslo i tibias amarillo-rojizas; muslos posteriores con una hilera de ocho espinas gruesas del mismo color; tarsos con el primer artejo tan largo como el segundo, tercero, cuarto i quinto juntos; del color de la tibia; los tres ultimos artejos marcadamente negros; pulvilos blanco-amarillentos.

Lonj. 12 milímetros; estension alar 20 milímetros.

Alotipo 1 hembra colectada en Valparaiso. En la coleccion Reed.

Esta hembra corresponde al macho descrito por R. A. Philippi bajo la denominacion de *Megascelus nigricornis* en «Aufzählung der chilenischen Dipteren», pag. 683, Tabl. XXV, fig. 21. Philippi nada dice sobre el sexo i la descripcion se refiere al macho. No hemos encontrado nada tampoco en la literatura consultada, sobre la hembra de esta especie por lo cual la hemos descrito ahora. Existe un marcado dimorfismo entre ambos sexos; la hembra es totalmente negra a escepcion de las estremidades que son de color amarillo-rojizo, mientras que el macho tiene el abdomen escepto el primero i ultimo anillo abdominal amarillo rojizo.

*Apiophora elvirae*, n. sp. ♀

Hembra, color rojizo, antenas del mismo color; ojos negros, completamente glabros; frente con pelos isabelinos. Torax rojizo con cuatro manchas bien visibles color bruno; escutelo con una mancha del mismo color; todo el torax es glabro. Alas lijaramente ahumadas; nerviacion en jeneral testacea escepto en la base donde es lijaramente oscurecida. Primer anillo del abdomen rojizo; segundo, tercero, cuarto i quinto con la base negra i el extremo amarillento; los ultimos negros. En todos los anillos se nota lijera pubescencia. Las patas son rojizas provistas de escasos pelos cortos i tiezos; los femures del tercer par de patas son gruesos, robustos, provistos de fuertes cerdas que mas parecen puas; tibias con un gancho bien manifiesto en su cara interna; tarsos provistos de abundantes cerdas; uñas negras.

Lonj. 15 mm.; lat. 5 mm.; amplitud alar 32 mm.

Holotipo una hembra colectada en los Baños de Cauquenes por el Profesor Edwyn C. Reed. Esta especie te-



nemos el agrado de dedicarla a la memoria de su esposa Elvira.

La nueva especie es mui parecida a *Apiophora paulseil* Phil. de la cual se distingue a primera vista por su mayor tamaño i color rojizo vivo.

*Midacritus wagenknechti*, n. sp. ♀♂

Hembra, cabeza, torax i antenas negras; frente i vertice con pelos blanco-amarillentos i escasos; torax con una pequeña carena saliente en ambos lados, la que termina con un abultamiento en la rejion humeral, negra; en el centro del torax dos lineas negras i a los lados una mancha grande del mismo color. El escutelo es completamente liso con abultamiento transversal en su parte superior. Todo el torax esta provisto de escasos i cortos pelos blanco-amarillentos. Pleuras i metapleuras con mechones de pelos. Alas completamente hialinas; nerviacion bruna. Balancines con la base bruna i el extremo testaceo. Abdomen, primer anillo negro provisto de escasos pelos blanco-amarillentos, segundo, tercero, cuarto, quinto i sexto negros con los bordes amarillento-rojizos. En todos los segmentos o anillos hai manchas de pelos cortos i tupidos pelos blancos, cuyo conjunto da el aspecto de escamas. Patas con los femures negros i escasa pubescencia; femures posteriores con dos hileras de puas. Tibias i tarsos testaceos. Pulvilos del mismo color de los tarsos.

Macho, cabeza i torax negro; antenas con el ultimo segmento testaceo; los demas son negros. Torax revestido de pelos blancos, en lo demas igual a la hembra. Alas con la base testacea, el resto hialino, nerviacion testacea. Balancines iguales a los de la hembra. Abdomen con el primer anillo negro i abundantes pelos blanco-amarillentos. En los demas anillos predomina el color amarillo-rojizo; en el centro del abdomen se destaca una mancha negra en forma de herradura en cada segmento; en conjunto sucesivo forman estas manchas una banda central en toda la longitud del abdomen. Armadura jenal rojiza. Patas con los femures negros i una lista rojiza que recorre toda su longitud. En lo demas igual a la hembra.

Lonj. 15 milimetros; estension alar 25 milimetros.

Holotipo i alotipo un macho i una hembra de los Baños del Toro a 3.300 metros sobre el nivel del mar (Elqui, pro-

vincia de Coquimbo). Esta especie fué encontrada por el Sr. Rodolfo Wagenknecht a quien tenemos el agrado de dedicarsela.

*Mitrodetus matthei*, n. sp. ♂

Macho, cabeza, antenas, trompa negras; frente, vertex i detras de la cabeza con largos pelos albos. El primer articulo de las antenas largo, grueso, cilindrico; segundo brevísimo i esferico; tercero termina en esfera i con una pequeña saliente en su parte superior interna. Ojos negros, glabros. Torax negro con dos manifestas bandas ocraceas, provistas de escasos i cortos pelos blancos, dirigidos hacia atras. En los marjenes del torax hai dos bandas de pelos blancos, cortos i mui tupidos. Escutelo triangular, con escasos pelos blancos. Primer anillo del abdomen con pelos largos blancos, especialmente hacia los lados. Los demas anillos negros, con abundante pubescencia corta i negra, en los marjenes es mucho mas larga; en el borde inferior del segundo anillo hai una mancha blanca; en el tercero esta mancha abarca todo el borde i se ensancha hacia el margen; en los demas anillos tambien existe esta misma banda. Armadura jénital negra. Alas ligeramente ahumadas hacia la costa, el resto hialino-brunas; nervio costal i subcostal testaceos. Balancines color café. Patas pardo rojizas; pulvilos del mismo color.

Long. 13 milimetros; lat. 4 milimetros; amplitud 16 milimetros.

Holotipo, tres machos colectados en los arenales de Reñaca junto al mar (Valparaiso). Aunque se han colectados numerosos ejemplares durante varios años no tenemos ninguna hembra.

Dedicamos esta especie al Dr. Alfredo Matthei que posee una Quinta en Reñaca i nos ha ayudado con entusiasmo a coleccionar ahi.

*Mitrodetus chilensis*, n. sp. ♀♂

Hembra, trompa mas larga que la cabeza i torax juntos; cabeza, torax i antenas negras; ojos glabros, vertex i detras de la cabeza con pelos blancos largos, primer articulo de las antenas largo, cilindrico, tan largo como el segundo i tercero juntos; torax con dos lineas blancas longitudinales i escasos pelos blancos; en los marjenes del torax una faja

de pelos cortos blanco-amarillentos mui densos; escutelo con pelos blanco-amarillentos. El primer anillo del abdomen en su cara dorsal con pelos blancos pero escasos; los anillos segundo, tercero, cuarto, quinto, sexto i septimo negros con el borde posterior de un blanco sucio. Alas hialinas con nerviacion bruna. Balancines negro-brunos; patas totalmente negras; tarsos negros, pulvilos blanco-amarillentos.

Macho negro, frente i detras de la cabeza con pelos color gris; la cabeza es mas ancha que el torax, hecho que llama la atencion si se compara con el macho de otras especies del mismo jenero; el torax esta cubierto con pubescencia blanco-plomiza mui corta, dirigida hacia atras; en ella sobresalen dos lineas angostas de color negro que recorren el torax en toda su longitud; hacia el margen hai otras dos lineas mas anchas de color negro, ademas en el mismo margen existe una faja de pelos como en la hembra. En lo demas igual a ella.

Holotipo, una hembra de Elqui en el punto denominado Hurtado, W a g e n k n e c h t leg. Alotipo un macho de la misma localidad que la hembra, W a g e n k n e c h t leg. Ambos en coleccion Reed.

*Mitrodetus reedi*, n. sp. ♂

Hembra, trompa tan larga como la cabeza i torax juntos; de color negro; antenas con el primer articulo tan largo como los tres cuartos del tercero, cilindrico. El segundo esferico, de color negro-bruno todos. En el primer segmento hai pelos escasos, largos i tiezos; el resto de la cabeza es de color negro bruno, con los ojos glabros. En la frente i detras de la cabeza hai pelos largos i albos. Torax liso con una especie de collar de pelos blanco-sucios. A los lados presenta una banda de pelos largos del mismo color, que recorre toda su longitud formando dos lineas blancas de pelos cortos dirigidos hacia atras, tambien de color blanco-sucio. Abdomen negro-bruno; el primer anillo es negro con escasos pelos blancos erizados. Los seis anillos siguientes de color negro-bruno sin pelos, con bordes de color blanco opalino. El resto negro bruno sin pelos. Alas hialinas, con la base ahumada; nerviacion negro-bruno. Balancines bruno-testaceos. Patas brunas con las articulaciones de los femures i tibias amarillentas. Tarsos algo mas claros que las tibias pero del mismo color. Pulvilos blanco-amarillentos.

Lonj. 12 milímetros; lat. 2 milímetros, estension alar 18 milímetros.

Holotipo una hembra de Punta Teatinos (Chile norte) Rodolfo Wagenknecht leg.

Macho mas pequeño i solo difiere en que tiene las patas color castaño claro, con pelos negros cortos. Lonj. 10 milímetros; lat 1,5 mil.; estension alar 10,5 mil. Alotipo un macho de la misma localidad. Wagenknecht leg.

Ambos estan en la coleccion Reed.

Es una especie similar a *M. chilensis* de la cual se diferencia sin embargo a primera vista.

Con nuestra contribucion tenemos en Chile hasta hoi las siguientes especies:

1. *Dolychogaster nigricornis* Phil.
2. *Apophora paulseni* Phil.
3. *Amophora elvirae* Reed & Ruiz
4. *Mydas apicalis* Wied.
5. *Ectyphus rubrocinctus* Blanch.
6. *Midacritus stuardoanus* Séguy
7. *Midacritus wagenknechti* Reed & Ruiz
8. *Mitrodetus dentitarsis* Phil.
9. *Mitrodetus dimidiatus* Phil.
10. *Mitrodetus leucotrichus* Phil.
11. *Mitrodetus chilensis* Reed & Ruiz
12. *Mitrodetus matthei* Reed & Ruiz
13. *Mitrodetus reedi* Reed & Ruiz
14. *Mitrodetus thereviformis* Séguy.

Todos los tipos i paratipos de las especies que se describen quedan depositados en la coleccion particular del Dr. Edwyn P. Reed de Valparaiso, Chile.

## Six new species of the genus *Eurytoma* from Mexico (Hym.)

### Part II. *Atrateges* group

by Robert E. Bugbee, Fort Hays Kansas College, Zoology  
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(With 1 map and 10 figures)

Part I of this series of papers described the so-called *Mucronura* group which consisted of 5 new species of the genus *Eurytoma* bred from host species of the cynipid genus *Amphibolips* (Bugbee, 1941).

This paper (part II) describes 6 new species of the same genus bred from cynipid hosts of the genus *Disholcaspis*.

Following the plan outlined in the previous paper, mentioned above, this unit of six closely related species will be referred to as the Atrateges group as they are quite distinct in structure and host relations from the *Mucronura* group.

The *Disholcaspis* hosts of the six new eurytomid species, are divided by Kinsey into two complexes (i. e. *fungiformis* and *perniciosa*). The relationships of the parasitic species, however, appear to be so close that a similar division does not seem warranted for them. In other words while the cynipid hosts represent two closely related but divergent lines of evolution the parasites seem to have failed to be influenced by the divergence of the hosts. This, it is believed, does not necessarily invalidate any of the data presented here as one would not expect all parasites to follow in all respects, the same evolutionary paths as their hosts. There is evidence of this from many sources within the family *Eurytomidae* itself, some of which is pointed out in Part I describing some additional new species from Mexico (Bugbee, 1941). Obviously such relationships must be worked out for each species of parasite and host. Where parasitic species seem to be confined to a single species of host just that much more valuable data is available to help in distinguishing them. The restriction of one parasite to one host or the apparently opposite situation (one parasite for many hosts) that have arisen within the same family, genus or even lower categories offers an intriguing study. The factors that may be involved are of course many and an attempt to analyze them here would take more space than could be afforded. It seems that we need many more studies of such groups from especially a combined ecologic and taxonomic point of view before any clear picture of the many factors involved can be presented.

The first two species about to be described are very close morphologically and occur in neighboring localities on two closely related gall-making hosts on closely related oaks. The differences between them are chiefly a matter of variation in averages. If a division of the six species into complexes were to be made it would appear most logical to place these first two in one complex and the remaining four in a



Map 1. General distribution of the species of *Eurytoma*, *Atrateges* group.

second complex. As already pointed out, this would agree with the division among their hosts but with the material on hand at present, sufficient grounds have not been found to warrant the division of the parasites.

The general distribution of the species is shown on map number I and their descriptions follow.

*Eurytoma atrateges*, n. sp. (Figs. 1 and 2)

Female. - Length 2.9-3.8 mm.; average 3.4 mm. Abdomen oval from the side, the width from a dorsal view averaging .65 mm. and the depth from a side view 1 mm.; exposed posterior portion of the dorsal valves short, averaging about .19 mm. in length with a range of .15-.22 mm.; fine punctation on the sides of segments six covers about 3/4 of lateral surface; most pronounced basally and becoming faint dorsally; long, scattered, silvery-white hairs on lateral aspect of segment 6 limited to upper half and range from 11-21 with an average of 17; segments 4 and 5, combined dorsally, average about twice the width of segment 6; internal genitalia averages

1.8 mm. in length; dorsal valves same width throughout horizontal length; black, in most cases, extends only to where they turn dorsally. Legs with the coxa black; all femurs with black; extending from base outwards; fore-femur mostly  $3/4$  black with outer tip shading through reddish brown to lemon yellow; lesser amount of black on mid-femur; hind-femur all black except outer tip which is reddish brown to lemon yellow; all tibiae with black medially; appears as a long black spot on outer face of fore-tibia; encircles middle of mid and hind-tibia leaving reddish brown to lemon yellow tips. Head as seen from above rounded across front and its width averages about .98 mm. and its length .41 mm.; eyes not bulgy above; scape of antenna black, except at base in most cases where it may be yellow; in a few cases yellowish tinge may extend upwards on outer face. Wings average 2.2 mm. in length; veins straw yellow in color; post marginal averages .24 mm. in length and marginal .26 mm; stigmal club most often rectangular in shape but in a few cases may be gently rounded basally; wing body ratio of 1.54.

Males. — Average in length 2.4 mm.; range from 2 mm. to 2.8 mm.

Types. — 15 females and 7 males; holotype female, allotype male and paratypes of both sexes in Bugbee collection. Paratype males and females in the U. S. National Museum.

Type locality. — Labels read: Cantuna, 6 miles north; state of Zacatecas, Mexico. 7600 feet elevation; galls collected on November 19, 1931; emerged in October, 1932.

Hosts. — Labels read: ex galls of *Disholcaspis (juniperiformis) hystricosa* (Kinsey MS.) on *Quercus undata*, Kinsey det. and coll.

Range. — Occurs in the state of Zacatecas in the north central part of Mexico on the slopes of the Western Sierra. Further to the north on *Quercus undata* in the state of Durango this species is replaced by *E. undata* n. sp. which occurs not only on a different species of gall making host (*Disholcaspis perniciosus quadrata* Kinsey MS) but on a host placed in a different complex. This whole group of parasites described here, however, appears so uniform morphologically that I have not found enough data to warrant separating the parasites into two complexes.

*L. atrateges* is the smallest of the 6 species described and differs from its closest relative *E. pilosa* n. sp. chiefly in a matter of averages. In such items as its size, length of the exposed portion of the dorsal valves, length of the postmarginal and marginal veins, etc., it averages consistently smaller than *E. pilosa*. However, a thorough study of its structure has revealed structural differences that may be used as typically diagnostic of this species. For instance, in the greatest majority of cases there is black infuscation on all femurs and tibia, and the stigmal club is rectangular in shape rather than triangular as in the next species. In addition, in all the specimens studied the combined length of abdominal segments 4 and 5 averaged twice the length of segment 6 viewed dorsally. From a lateral view the width of segments 6 at its widest place is less than the combined width of segments 4 and 5 at their widest place. These features combined with the average shorter length will make it possible, it is believed, to distinguish this species fairly easily. *L. atrateges* furthermore has a more northern distribution (state of Zacatecas) than *L. pilosa* and occurs at the somewhat higher altitude of 7600 feet.

*Eurytoma pilosa*, n. sp. (Figs. 3 and 4)

Female. — Length ranges from 3.1 to 4.2 mm.; average 3.8 mm.; abdomen oval from the side; width averages .75 mm. and the depth averages 1.1 mm.; exposed posterior portion of the dorsal valves ranges in length from .17 to .27 mm. with an average of .22 mm.; silvery-white pile on lateral aspect of segment 6 profuse, ranging from 11 to 37 with an average of 20 and scattered from the top of the segment to well down towards the base; the combined width of segments 4 and 5 averages 1 1/2 times greater than the width of segment 6 viewed dorsally; from a lateral view segment 6 at its widest point about equals the width of 4 and 5 combined. Internal genitalia ranges in length from 1.6 to 2 mm. with an average of 1.7 mm.; width of dorsal extension is equal to about 1/2 the horizontal length, thus whole structure appears shorter and higher than in other species of this group, black on dorsal valves may extend anteriorly only as far as dorsal curvature of valves or dorsal curvature may be wholly black. Legs: coxae black, hind-femurs always black medially and usually all black except for brownish to yellowish tips; mid-femurs most often with black ring medially; fore-femurs with black flaring up from base and covering from 1/2 to 3/4 of femur or they may be wholly brown shading into yellow at outer tip; tibia with varying amounts of black medially; mid-tibia with black ring



medially or totally light brown or yellow; fore-tibia with a black splotch medially on outer face or entirely light brown or yellow. Head rounded in front from above with eyes bulging laterally; width varies from 1 to 1.2 mm.; average 1.1 mm.; length from .40 to .50 mm.; average .46 mm. Antenna filiform; scape either with an all yellow outer face or all black except for basal 1/3 or 1/4 which may be yellowish to brownish. Wings: wing body ratio ranging from 1.40 to 1.54 with an average of 1.47; postmarginal vein ranges in length from .25 to .32 mm. with an average of .27 mm., and marginal from .27 to .35 mm. with an average of .32 mm.; stigmal club small; most often triangular shaped with the broad base of the triangle outward.

**Males.** — Smaller than the females; ranging in length from 2.0 to 3.2 mm. with an average of 2.7 mm.

**Types.** — 19 females and 27 males; holotype female, allotype male and paratypes of both sexes in Bugbee collection. Paratype males and females in the U. S. National Museum.

**Type locality.** — Labels read: Aquascalientes, 3 miles southeast; state of Jalisco, Mexico, 7000 feet elevation; galls collected on November 28, 1931; emerged fall of 1932.

**Host.** — Labels read — from galls of an undescribed species of *Disholcaspis jungiformis* complex on *Quercus undata*, Kinsey det. and coll.

**Additional localities and hosts.** — Labels read: Querétaro, 28 miles north, state of Querétaro, Mexico; 7300 feet elevation; galls collected on January 17, 1932; emerged July 25, 1932 and August 11, 1933; from galls of an undescribed species of *Disholcaspis jungiformis* complex on *Quercus chihuahuensis*, Kinsey det. and col.

**Range.** — States of Jalisco and Querétaro. This highly variable species extends over a wide range in the south central part of Mexico, occurring on two oaks which are closely related, *Quercus undata* and *Quercus chihuahuensis*. It is one of the largest ranges of any of the species treated in this group. It is interesting to note that it occurs uniformly above 7000 feet elevation.

This species is quite variable and for some time was thought to represent two species. When various characters were compared, however, considerable overlapping was found to occur. For instance, the scape in the material from Querétaro showed an anterior face that was all yellow in most of the specimens and all black in

only a few. The reverse was true in specimens from Aguascalientes where only a few showed a yellow anterior face and a greater number had black scapes. The fore-tibia of Querétaro material in the greater number of cases was all yellow with a black splotch appearing in only a few cases while the opposite situation was characteristic of specimens from Aguascalientes. In no case could a consistent group of characters be established which would clearly distinguish one from the other. As their gall-making host species have not been described those data are not available so that it seemed best to describe them as one species, drawing attention to the fact that some evidence of segregation is suggested in material from any one locality. They both occur on undescribed gall-makers of the genus *Disholcaspis*, (fungiformis complex) on different but closely related species of oak, and their emergence times are quite different. This suggests that they might be distinct species but without correlating structural characters the evidence is not sufficient to separate them. More material consisting of larger series might in the future lead to a clearer diagnosis of this variable species.

*E. pilosa* is very close to *E. atrateges* in its general morphological characteristics. The main differences between the two are, for the most part, a matter of differences in averages, as pointed out in the discussion following the description of *E. atrateges*, and in relation of the width of the 6th abdominal segment to the width of segments 4 and 5 combined. In this species the widths, from a lateral view, are about equal while from a dorsal view 4 and 5 combined are about 1.1-2 times wider than 6. This species ranges to the south of *E. atrateges* over a rather wide area at a lower altitude ranging from 7000 to 7300 feet.

*Eurytoma leptorena*, n. sp. (Figs. 5 and 6)

Female. - Length from 3 to 4.2 mm., average 3.7 mm. Abdomen oval in outline from a lateral view; average depth is equal to 1.1 mm. and the average width is equal to .85 mm.; white pile on dorso-lateral aspect of segment 6, sparse, ranging from 4 to 8 with an average of 5; whole abdomen less hairy than other species, especially 7, 8, and 9 segments; length of exposed posterior end of the dorsal valves averages about .28 mm.; pitting on the lateral aspect of segment 6 less coarse and not so extensive as in other species of this group; segment 6 at its greatest width, wider than segments 4 and 5 combined at their greatest width. Internal genitalia of typical form with total average length of 1.9 mm.; average width of .85 mm.; thus the valves beyond the anterior dorsal curvature are longer than in *Eurytoma pilosa*: whole genitalia light yellow in color except for the black dorsal valves on which the black color extends along

dorsal valves for their whole length, becoming lighter or less intense on dorsal anterior extension of valves. Legs: coxae black; femurs all with black infuscation; hind-femur all black except tips which shade through brown to yellow; mid-femur with black basally, flaring upward to cover  $1/2$  or less of the surface; fore-femur with black flaring upward to cover  $1/2$  to  $3/4$  of surface; hind-tibia with black ring medially; mid-tibia with slight black tinge or deep brown medially shading through brown to yellow tips; fore-tibia deep brown medially with yellow tips. Head: flat across the front with eyes noticeably bulging laterally; average length from above .45 mm.; average width 1.1 mm. Antenna filiform with the scape all yellow to reddish brown on anterior face; maybe a slight blackish tinge toward top in a few; pedicle often deep reddish brown to yellow. Wings: veins lemon yellow in most to light brown in a few; not heavy or stout; marginal vein averaging in length .35 mm. and the postmarginal averaging .30 mm.; stigmal club usually small, elongate and flat to gently rounded basally. Wing body ratio of 1.27.

Males. — Length varies from 2 to 3 mm. with an average of 2.8 mm.; black on all legs except fore-tibia. Scape most often black except for yellow to reddish brown base; a few anterior face all yellowish brown.

Types. — 13 females and 21 males; holotype female and allotype male and paratypes of both sexes in Bugbee collection; paratypes in the United States National Museum.

Type locality. — Labels read, Guadalajara, 25 miles south, state of Jalisco, Mexico, elevation 6000 feet, galls collected December 23, 1931; males and females emerged October 20 to November 20, 1932.

Hosts. — Labels read: from galls of *Disholcaspis (perniciosa) raptor* (Kinsey MS), Kinsey det. on *Quercus macrophylla*, Kinsey coll.

Range. — At present known only from Guadalajara in the state of Jalisco located in the west central part of Mexico.

This species appears to be closely related to the succeeding species *F. undata* in the following ways: shape of the abdomen, color distribution and shape of the genitalia, general color distribution on the legs, etc. The small number of hairs on the sixth abdominal segment, the greater width of the 6th abdominal segment in relation

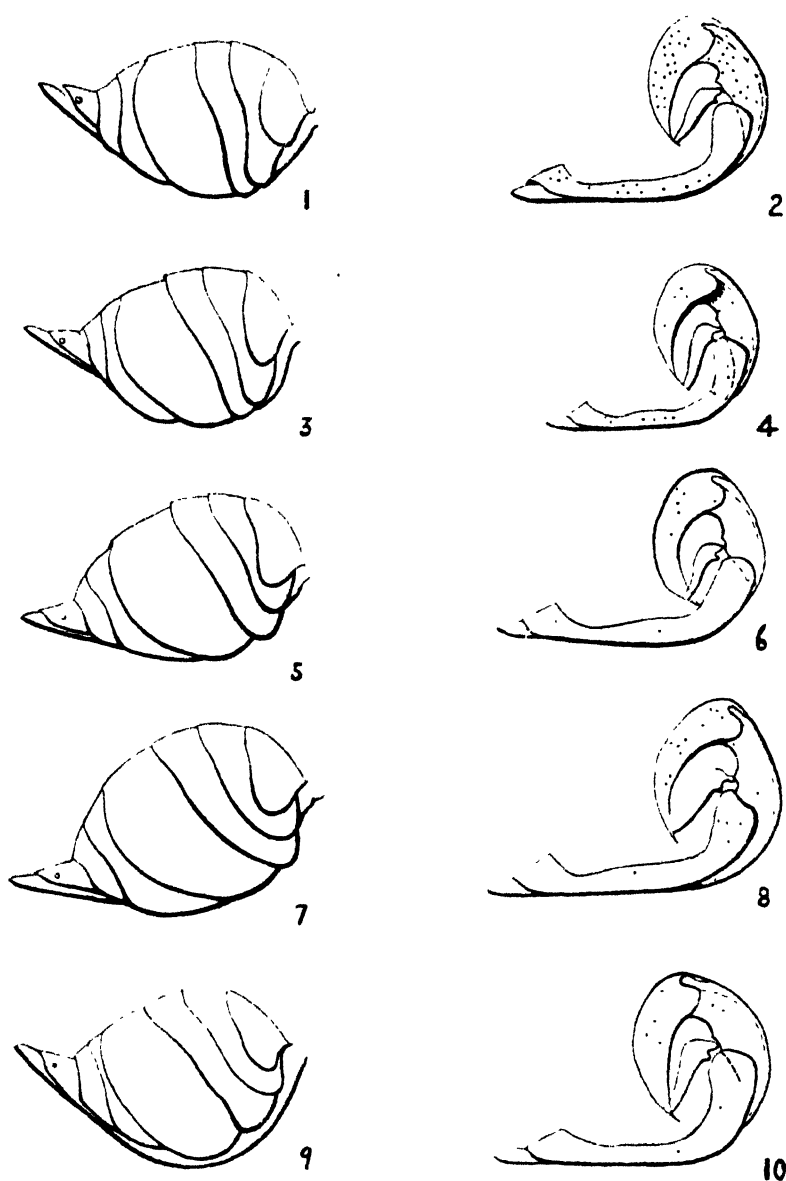


Fig. 1 *Eurytoma atrateges* n. sp., abdomen. — Fig. 2. *Idem*, genitalia. — Fig. 3. *E. pilosa* n. sp., abdomen. — Fig. 4. *Idem*, genitalia. — Fig. 5. *E. leptovena* n. sp., abdomen. — Fig. 6. *Idem*, genitalia. — Fig. 7. *E. kiraita* n. sp., abdomen. — Fig. 8. *E. undata* n. sp., genitalia. — Fig. 9. *E. fulva* n. sp., abdomen. — Fig. 10. *Idem*, genitalia. (For drawings insects enlarged to 150 mm.)

to the width of segments 4 and 5 combined, the all yellow scape, total absence of black on the fore-tibia and the distinct host species and less hairy appearance will distinguish this species from the others.

*Eurytoma undata*, n. sp. (Fig. 8)

Female. — Length 3 to 3.5 mm.; average 3.3 mm.; abdomen oval from the side; depth averages 1.1 mm. and width .75 mm.; exposed posterior ends of the dorsal valves average .25 mm. in length; number of hairs on the lateral aspect of segment 6 range from 8 to 31 with an average of 16; scaling or pitting on the side of segment 6 not as coarse or as extensive as in *E. hirsuta*; covers lower 2/3 of segment playing out dorsally. Internal genitalia averages 1.8 mm. in length; width .37 mm.; color yellow to tan except for dorsal valves which are black; black may extend backward to where valves turn dorsally where it ends abruptly or it may run part way up onto dorsal extension of valves. Legs: coxae black; trochanters black; hind-femurs black with reddish brown to lemon yellow tips; fore-femur with black which flares up from base and covers about 1/2 to 3/4; mid-femur with least amount of black, covering 1/2 or less; fore-tibia most often all reddish brown; hind-tibia with varying amounts of black medially, tips reddish brown; mid-tibia may be tinged with black medially or deep reddish brown; tips of femurs and tibia usually lemon yellow to brown. Head, mediumly rounded across front as seen from above; averaging in width 1 mm. including the eyes and in length .49 mm. Scape of antenna black except for base which may be light reddish brown or whole anterior face deep reddish brown. Wings average 2.6 mm. in length; wing body ratio of 1.27; veins light straw colored and thin; postmarginal averages .27 mm. in length and the marginal .30 mm. Stigmal club gently rounded to flat basally.

Males. — Length ranges from 2 to 3 mm.; average of 2.7 mm. Leg parts not black are lemon yellow; scape all black.

Types. — 7 females and 4 males. Holotype female and allotype male and paratypes in Bugbee collection; paratypes of both sexes in U. S. National Museum.

Type locality. — labels read: Villa Campos, 21 miles south, state of Durango, Mexico; 6700 feet elevation; galls collected on October 30, 1931; males and females emerged, spring of 1932.

Hosts. — Labels read: *Disholcaspis (perniciosa) quadrata* (Kinsey MS.), on *Quercus undata*, Kinsey coll.

**Range.** — Known so far only from Villa Campos, in the state of Durango in the northwestern part of Mexico.

This species appears to fall in between the preceeding species and the following *Eurytoma hirsuta*. More brown and less yellow on the legs, the black or dark brown scape and emergence in the spring suggest affinities with *E. hirsuta* although the brown of the legs and the scape is not so pronounced, and is more like the color distribution in *E. leptovena*. The number of hairs on the 6th abdominal segment is greater than in *E. leptovena* but not as many as in *E. hirsuta*. The distinct host is also a characteristic of this species. Furthermore *E. undata* emerges in the spring while *E. leptovena* emerges in October and November.

*Eurytoma hirsuta*, n. sp. (Fig. 7)

**Female.** -- Length 3.2 to 4.2 mm.; average 3.8 mm. Abdomen deeply oval from the side averaging 2 mm. in length; depth averaging 1.3 mm. and width averaging .42 mm.; number of hairs on the lateral aspect of 6th abdominal segment ranges from 20 to 40 with an average of 28; length of the exposed, posterior ends of the dorsal valves averages .26 mm. Considerable dorsal extension of the internal genitalia; average length of whole internal genitalia 1.9 mm.; general color dark brown, except black on dorsal valves which runs from posterior to dorsal curvature where it stops abruptly just before valves turn dorsally. Legs: coxa and trochanters black; femurs all with black infuscation; on fore-femur it flares up from base and covers about 1/2 of femur; greatest amount of black on hind femur which is often totally black except outer tip; tibiae often with black medially, greatest amount on hind-tibia; front and mid-tibia may lack black infuscation in many cases. All parts not colored black are a deep reddish brown, often shading into lemon yellow on tips of femurs and tibiae. Head: quite flat across the front; eyes mediumely bulgy laterally; width including the eyes averages 1.2 mm.; length .48 mm. Scape of antenna may be black with a touch of deep reddish-brown basally, or deep reddish-brown may cover lower 1/2. Wings: average in length 2.8 mm.; wing body ratio of 1.35; wing veins brownish yellow and thin; postmarginal vein almost equal to marginal; postmarginal averages .34 mm. in length, and marginal equals .39 mm. in length; stigmal club elongate and flat or gently rounded basally.

**Males.** — Length 2.7 to 3.6 mm.; average 3.1 mm.

**Types.** — 21 females and 8 males. Holotype female and allotype male and paratypes in Bugbee collection; paratypes of both sexes in U. S. National Museum.

**Type locality.** — Labels read, Cerritos, 25 miles west; state of San Luis Potosí, Mexico; 6000 feet elevation; galls collected on December 2, 1931; males and females emerged spring of 1932.

**Hosts.** — Labels read, from galls of *D'sholcaspis (perniciosa) potosina*, Kinsey det. (Kinsey, 1937) on *Quercus potosina*, Kinsey coll.

**Range.** — Known only from Cerritos in the state of Luis Potosí; Kinsey (1937) has the following to say concerning the range of its host, «Probably restricted to a portion of the Eastern Sierra of Mexico including the eastern mountains of San Luiz Potosí.» The parasite might be expected to cover much the same range.

*E. hirsuta* is a large species and the deeply oval abdomen, the greater number of hairs on the sixth abdominal segment, the greater quantity of deep brown on the legs, flat face as viewed from above, brown color of the wing veins and genitalia and the subequal marginal and postmarginal veins, easily distinguish it. As stated after the following description, *E. hirsuta* shows some affinities with *E. fulva*. However, because of the distribution of black on the legs and scape, the longer postmarginal vein in relation to the marginal, etc., it seems to be nearer *E. undata*. Thus until more material from a greater number of localities can be studied it seems best to consider *E. hirsuta* as closer to *E. undata* than to *E. fulva*.

*Eurytoma fulva*, n. sp. (Figs. 9 and 10)

**Female.** — Largest known species in this group; length 3.4 to 4.5 mm. with an average of 3.9 mm.; the abdomen seen from the side deeply oval to almost round; average depth is equal to 1.2 mm. and the average width equals .80 mm; abdomen appears deeper and thus greater laterally compressed than in other species of this group; silvery-white pile on lateral aspect of segment 6 rather sparse, varying from 5 to 17 with an average of 10; sculpturing on lateral aspect of segment 6 in the form of shallow pits is coarser and heavier than in the other species; pits become shallower and finer dorsally and cover whole surface of segment. Internal genitalia average 1.9 mm. in length and width, averages about .90 mm.; black of dorsal valves ends abruptly before dorsal

curvature of dorsal valves; general color light yellow. Legs: general color is deep reddish-brown on all femurs and tibia with slight indication of black infuscation on hind-femurs *only*; in most cases reddish brown most intense medially shading to yellow at tips of femurs and tibia. Head: full and gently rounded in front from above; scape of antenna usually yellow on anterior face and pedicle often deep brown to reddish-brown; in a few cases upper  $1\frac{1}{4}$  of scape black, rest yellow. Wings: veins light straw yellow, thin and fine; postmarginal long and thin and approximately equal in length to marginal; marginal averages in length .30 mm. and the postmarginal averages .30 mm.; stigmal club rounded gently or flat basally.

Types. — 50 females and 34 males; holotype female, allotype male and paratypes in Bugbee collection; paratypes of both sexes in U. S. National Museum.

Type locality. — Labels read, San Buenaventura, 3 miles east; state of Chihuahua, Mexico; 5600 feet elevation; galls collected October 16, 1931; males and females emerged spring of 1932, 1933, 1934 and 1935.

Additional localities. — Labels read, Pacheco, 20 miles east; state of Chihuahua, Mexico; 5400 feet elevation; galls collected on October 11, 1931; males and females emerged July, 1933, 1934, and 1935.

Hosts. — Labels read, San Buenaventura; from galls of *Disholcaspis (perniciosa) punicea* (Kinsey MS), on *Quercus sacame*, Kinsey coll., also a series from the same locality on *Quercus chihuahuensis*. Pacheco; from galls of *Disholcaspis (perniciosa) punicea* (Kinsey MS.) on *Quercus sacame*, Kinsey coll.

Males. —Length ranges from 2.2 to 3.1 mm.; with an average of 2.6 mm.; legs with considerable black infuscation, especially on femurs and mid and hind-tibia; scape either all yellow, or black with base yellow only.

Range. — Known from San Buenaventura and Pacheco, both in the state of Chihuahua. Probably restricted to the northern portion of the western Sierra of Mexico, including the western mountains of Chihuahua and Durango.

This species has the characteristic black of the legs, which is found usually medially on the femur and tibia, replaced in most cases by a *deep brown*. In addition, the round to deeply oval abdomen and the equal marginal and postmarginal wing veins will easily distinguish *I. fulva* from the other species. It seems to be most



closely related to the material from Cerritos, *E. hirsuta*, but because of their remote positions geographically it would seem likely that extensive collections from in between the two points would probably produce species which would be closer. Both *E. fulva* and *E. hirsuta* occur at about the same altitude, 5600 feet respectively. A glance at a map of Mexico shows that they thus occur at about the same elevation among the foothills of the mountains at distant points. With this in mind the fact that the species are quite different suggests the probability that species more closely related to *E. fulva* may occur in between.

A glance at the emergence dates for this species will disclose the fact that it emerged over a period of four years during July and August. The galls were collected in the fall of 1931. During July and August of the next four years 1932, 1933, 1934, and 1935, specimens of this parasite continued to emerge in diminishing numbers. This phenomena of retarded development, probably a state of true diapause, has been noted before in the family Eurytomidae, in *Eurytoma rhois* Crosby, (Bridwell, 1923 and Bugbee, 1939) In *E. rhois* healthy larvae may be found in seeds (Sumac) up to two years after the date of collection. Bridwell believes that such factors as temperature and drouth determine the diapause in these chalcids. From the authors experience in breeding these insects, however, is a suggestion that there may be genetic strains within the populations that are not influenced by environmental factors. If external factors account for it only, it would seem that in years when rainfall is plentiful and temperatures not unreasonable high, etc. that a 100% emergence should occur. That does not necessarily follow in these chalcids as a check of such factors in the locality where *E. rhois* was collected has shown. Furthermore, some, but not all of these parasites can be forced in the laboratory after they have undergone one good cold spell which also suggests that if conditions were uniform in a local area a 100% emergence might be expected if environmental factors were the only control. It is also possible of course that the condition might exist in which a so-called heterodynamic generation may alternate with one or more homodynamic generations (Wigglesworth, 1939).

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**Zweiter Beitrag zur Kenntnis der neotropischen Malacodermata**

von W. Wittmer, Buenos Aires

**Fam. Malachiidae***Lemphus bosqi*, nov. spec.

Schwarz, Basalglieder der Fuehler bis zum 4. oder 5. Gliede gelb, eine durchgehende Quermakel auf den Fluegeldecken weiss (ein Exemplar hat stark verdunkelte Fluegeldecken, die Quermakel ist auf einen kaum wahrnehmbaren Flecken auf jeder Decke reduziert: ab. *obscurior* nov.), Schienen und Tarsen und meistens auch die aeusserste Spitze der Schenkel, gelb.

♂. — Kopf mit den Augen etwas schmaeler als der Halsschild, fast vollstaendig glatt, ueber den Fuehlerwurzeln kurz laengseingedrueckt. Fuehler kurz, den Hinterrand des Halsschildes nicht erreichend, alle Glieder breiter als lang, mit Ausnahme der ersten 4; 5. so breit wie lang; 11. etwas laenger als breit. Halsschild gut 1 1/2 mal so breit wie lang, Vorderrand fast gerade abgestutzt, Vorderecken stumpfwinklig, Basalrand mit den Basalecken vollstaendig verrundet; glatt, mit Ausnahme einzelner zerstreuter Haarpunkte. Fluegeldecken stark verkuerzt, die letzten 4 Hinterleibstergite unbedeckt lassend, Punktierung deutlich, maessig grob und dicht. Behaarung des ganzen Koerpers doppelt, fein, kurz greis und lang schwarz, die doppelte Behaarung ist am deutlichsten auf den Fluegeldecken und auf den unbedeckten Tergiten ersichtlich.

Laenge: 3,2-3,5 mm.

Fundort: Prov. Misiones, Pindapoy (Argentinien), Oct. 1935, leg. Juan M. Bosq. Type und Cotypen in der Sammlung Bosq, Cotype in meiner Sammlung.

Die neue Art ist mit *L. albofasciatus* Pic sehr nahe verwandt und hat mit dieser die gelblichweisse Quermakel auf den Fluegeldecken gemeinsam, die Faerbung des Restes der Decken und die Punktierung sind jedoch verschieden. *L. bosqi* m. fehlt der blauviolette metallische Schimmer auf der Basis und den Spitzen der Decken vollstaendig; die Punktierung der Decken ist bei *bosqi* gleichfoermig, auf der weissen Quermakel ebenso beschaffen wie auf dem Rest der Decken, waehrenddem bei *albofasciatus* Pic die Quermakel tiefer und dichter punktiert ist als der Rest der Decken. Die Fuehler des ♂ sind etwas schmaeler als bei *albofasciatus*.

Dem Entdecker, meinem werten Sammelfreund, Herrn Juan M. Bosq gewidmet.

*Attalus bruchi* Pic

Die untersuchten Exemplare<sup>1</sup> zeigen, dass die Art nicht in die Gattung *Attalus* gehoert. Die Merkmale weisen eindeutig auf die Gattung *Cryptotarsus* Kirsch (Berl. Ent. Zeitsch. IX, 1865, p. 88), von der bisher nur eine einzige Art aus Columbien bekannt war. Die Gattung unterscheidet sich von allen anderen *Malachiidae* durch das 4. Tarsenglied, das stark verkuerzt ist, mit dem letzten verschmolzen zu sein scheint und von den breiten Lappen des 3. fast ueberragt wird. Zu den von Kirsch angefuehrten Gattungsmerkmalen ist nur hinzuzufuegen, dass die Fuehler bei den beiden Geschlechtern nicht immer gleichfoermig gebildet sind, bei der obigen Art z. B. stark faecherfoermig beim ♂ und gezaehnt beim ♀. Auch die Tiefe des Einschnittes am letzten Abdominalsegmente ist sehr variabel bei den einzelnen Arten, manchmal kaum angedeutet (*C. misionum* m.) oder tief ausgeschnitten (*metallicus* m. und *tropicus* Kirsch).

Tabelle der *Cryptotarsus*-Arten

1. Halsschild und Fluegeldecken einfarbig schwarz oder metallisch 2
- Entweder der Halsschild (manchmal einfarbig rot) oder die Fluegeldecken mit roten oder gelbbraunen Makeln versehen . . . 3
2. Fuehler des Maennchens vom 5. Gliede an lang gekaemmt, 3. und 4. Glied stark gezaehnt; beim Weibchen alle Glieder stark gezaehnt, beginnend mit dem 4. . . . . *C. bruchi* Pic
- Fuehler des Maennchen schwach saegefoermig erweitert, Glieder ziemlich langgezogen, beim Weibchen etwas kuerzer, kaum schwaecher gezaehnt. Bedingt durch die etwas kuerzeren Glieder bei gleicher Dicke treten die Zaehne deutlicher zum Vorschein als beim Maennchen . . . . . *C. metallicus* nov. spec.
3. Halsschild einfarbig rotbraun, Fluegeldecken einfarbig blau . . . . *C. tropicus* Kirsch.
- Halsschild entweder einfarbig schwarz, oder schwarz mit der Basis und manchmal auch den Seiten in variablem Umfange rot. Fluegeldecken mit gelbbrauner oder roter Zeichnung . . . . . 4
4. Halsschild und Fuehler einfarbig schwarz, Beine schwarz, nur die Tibien und Tarsen, meistens der Vorderbeine, etwas braeunlich

(1) Bei dieser Gelegenheit moechte ich den Herren Dr. Birabén des Museu de La Plata und Juan M. Bosq, fuer das bereitwilligst zur Verfuegung gestellte Untersuchungsmaterial, meinen besten Dank sagen.

aufgeheilt; Fuehler des Weibchens stark gezaehnt, 8. und folgende Glieder deutlich breiter als lang. Kopf durch die weniger stark hervortretenden Augen etwas laenger erscheinend . . . . .

*C. misionum* nov. spec.

- Halsschild schwarz mit der Basis und den Seiten in variabler Ausdehnung rot (manchmal ueberwiegend rot, mit einer schwarzen Makel in der Mitte, den Vorderrand erreichend); Fuehler schwarz, 2. und 3. Glied aufgeheilt, Tibien und Tarsen mehr oder weniger aufgeheilt. Fuehler des Weibchens weniger stark gezaehnt als bei der vorangehenden Art, 8. Glied und folgende kaum so breit wie lang. Kopf durch die staerker hervortretenden Augen etwas breiter und kuerzer erscheinend als bei der vorangehenden Art. . . .

*C. blandulus* nov. spec.

*Cryptotarsus metallicus*, nov. spec.

Einfarbig schwarz, nur die Fluegeldecken, selten auch der Kopf und Halsschild, mit dunkelgruenem bis blauviolettem Metallglanze, bei einzelnen Exemplaren sind die Tibien und Spitzen der Tarsen etwas aufgeheilt.

♂. — Kopf mit den Augen schmaeler als der Halsschild, mit 3 bis 4 mehr oder weniger deutlichen Eindruecken versehen, ein senkrechter, kurzer, in der oberen Haelfte des Augenzwischenraumes, ein waagrechtter etwas unterhalb der Augenmitte (dieser Eindruck fehlt bei vielen Exemplaren) und zwei senkrechte unterhalb des Quereindruckes, die sich bis zur Fuehlerwurzel erstrecken. Fuehler laenger als der halbe Koerper; 1. Glied laenglich knoetchenfoermig, nur wenig laenger als das 2., bei der Ansicht von vorne gleich dick wie das 2.; vom 3. Gliede an schwach gezachnt, Staerke der Zahnung langsam abnehmend, vom 7. Gliede an ist die Abnahme in der Dicke am deutlichsten erkennbar; Glieder 3 bis 11 unter sich ungefaehr gleich lang; 11. kaum um 1/4 laenger als das 10. Halsschild laenglich oval, alle Ecken verrundet, Basalecken staerker als die Vorderecken verrundet, vollstaendig glatt, ziemlich lang und dicht behaart. Fluegeldecken an den Schulterbeulen etwas breiter als der Halsschild, ca. 2 1/2 mal so lang wie an den Schultern breit, gegen die Spitzen nur schwach verbreitert. Punktierung aeusserst grob und tief, verworren, manchmal fliessen 2 oder 3 Punkte ineinander. Letztes Abdominaltergit ziemlich spitz zulaufend, ueber die ganze Spitze hin, ausgeschnitten.

♀. — Von etwas gedrungenerer Gestalt, Fuehler kuerzer, Zahnung kaum schwaecher.

Laenge: 4,2-4,5 mm.

Fundort: Quime 3000 m (Bolivien), 1.11.1940. Type und Cotypen in meiner Sammlung.

*Cryptotarsus blandulus*, nov. spec.

Schwarz, Halsschild entweder schwarz mit der Basis und den Seiten in variablem Umfange rot, oder rot mit einem schwarzen Flecken in der Mitte des Vorderrandes; Fluegeldecken meist mit gruenlichem Metallschimmer, Seiten und Naht gelb bis rotgelb aufgehellt, jeder Streifen ca. 2 mal so lang wie breit, selten verschmilzt der Naht- mit dem Seitenfleck; 2. bis 4. Fuehlerglied gelbbraun; Tibien und Tarsen, manchmal auch ein Teil der Vorderschenkel, braun.

Kopf mit den Augen schmaeler als der Halsschild, fast glatt, leicht gewoelbt, mit einem punktförmigen, seichten Eindrucke auf der Mitte der Stirne, vor dem Halsschildvorderrande und einem noch seichteren Eindrucke ueber jeder Fuehlerwurzel. Fuehler verhaeltnismaessig kurz, knapp von halber Koerperlaenge; 4. bis 10. Glied saegeartig gezaehnt, 2. laenglicher, eine Spur kuerzer als das 1., 3. ca. 1/3 laenger als das 4., mehr als doppelt so lang wie an der Spitze breit, 4. bis 10. so lang wie an der Spitze breit, 11. laenglicher, nur wenig schmaeler und kaum laenger als das 10. Halsschild um die Haelfte breiter als lang, Basalecken vollstaendig mit den Seiten verrundet, Vorderecken schwach abgerundet, stumpfwinklig, Scheibe glatt, fein behaart. Fluegeldecken ca. 2 mal so lang wie an den Schultern breit, fast glatt, glaenzend, Behaarung zerstreut, greis, aufstehend.

Laenge: 2,3-2,8 mm.

Fundort: Jujuy (Argentinien) 10.10.1938. Type und Cotype in der Sammlung Juan M. Bosq, Cotype in meiner Sammlung.

*Cryptotarsus misionum*, nov. spec.

Schwarz, Fluegeldecken oft mit violetter Metallglanze, jede Decke mit 2 roetlichgelben Laengsflecken, der eine an der Naht, der andere auf der Seite, jeder ca. doppelt so lang wie breit, Enden zugespitzt, Hauptausdehnung etwas vor der Mitte, selten sind die Flecken miteinander verbunden; Schienen manchmal leicht aufgehellt.

Kopf mit den Augen deutlich schmaeler als der Halsschild; (Augen weniger stark hervortretend als bei den uebrigen Arten, Kopf dadurch schmaeler und laenger erscheinend) glatt, leicht gewoelbt, ein deutlicher Eindruck ueber jeder Fuehlerwurzel. Fuehler weniger lang wie der halbe Koerper, Glied 4 gegen die Spitze etwas staerker verbreitert als das 3., jedoch noch nicht saegeartig gezahnt wie die Glieder 5 bis 10, diese Glieder alle breiter als lang; 11. Glied laenglich-oval, in der Mitte ziemlich stark verdickt, weniger breit als das 10. Halsschild nur wenig breiter als lang, Basalecken etwas staerker als die Vorderecken verrundet, vollstaendig glatt, fein behaart. Fluegeldecken ca. 2 mal so lang wie an den Schultern breit, fast vollstaendig glatt, zerstreut, aufstehend weiss behaart. Das letzte Tergit ueberragt bei den beiden mir vorliegenden Exemplaren die Spitze der Fluegeldecken. Das Ende des letzten Tergites ist fast gerade abgestutzt, in der Mitte leicht ausgerandet, die Seiten der Ausrandung sind in kleine, stumpfwinklige Spitzen ausgezogen.

Laenge 2,8-3 mm.

Fundort: Prov. Misiones, Pindapoy (Argentinien), 10.1935. Type in der Sammlung Juan M. Bosq, Cotype in meiner Sammlung.

*Attalus alticola*, nov. spec.

♂. -- Schwarz, Kopf unterhalb der Fuehlerwurzeln, Clypeus und Unterseite der 2-3 ersten Fuehlerglieder, gelb; Halsschild dunkelbraun bis schwarz, Vorderrand aeusserst schmal braun aufgehellt, Basalrand etwas deutlicher gelb aufgehellt, die gelbe Faerbung ist am breitesten an den Basalecken; Fluegeldecken mit gelber Naht, der gelbe Streifen der Naht setzt sich um die ganze Spitze der Decken und an den Seiten fort (an den Seiten allerdings teilweise nur noch angedeutet) und endet kurz nach der Mitte in einem kleinen, ungefaehr um die Haelfte laengeren als breiten gelben Seitenfleck. Der Nahtstreifen erlischt kurz vor dem Schildchen ganz; ungefaehr auf der Hoehe des gelben Seitenfleckens ist der vorher beschriebene Nahtstreifen schwach erweitert.

Kopf mit den Augen schmaeler als der Halsschild, glatt, zwei undeutliche Laengseindruecke befinden sich zwischen den Augen. Fuehler kurz, einfach, alle Glieder ausser dem 2. laenger als breit. Halsschild glatt, fein, greis, anliegend behaart, alle Ecken vollstaendig verrundet, die Basalecken staerker als

die Vorderecken. Fluegeldecken doppelt so lang wie an den Schultern breit, gegen die Spitze nur schwach verbreitert, Seitenleiste hinter den Schulterbeulen kaum angedeutet, Punktierung verschwommen. Behaarung auf der ersten Haelfte der Fluegeldecken fast senkrecht abstehend und auf dem Abfalle der Decken schraeg abstehend.

Laenge: 3,5 mm.

Fundort: Quime (Bolivien), 2500 m, 1.2.1941. Type in meiner Sammlung.

Verwandtschaftlich gehoertt die Art neben *A. brasiliensis* Pic, von der sie sich in erster Linie durch die undeutlich punktierten Fluegeldecken, bei denen die Seitenleiste hinter den Schulterbeulen stark zurueckgebildet ist, unterscheidet. Ausserdem ist die Faerbung der Beine verschieden, und zwar einfarbig rotgelb bei *brasiliensis* und einfarbig schwarz bei *alticola*.

Die Gattung *Pseudattalus* Champ. (Trans. Ent. Soc. London 1911, p. 79) wurde vom Autor aufgestellt fuer eine Anzahl mittelamerikaischer Arten. Die Hauptmerkmale sind: nur 9-gliedrige Fuehler beim Mannchen, die kleine und gedrungene Gestalt (Totallaenge 1 1/3 bis 2 1/2 mm), das erste Glied der Vordertarsen ist auf der Oberseite erweitert (Mannchen). Die erwaehnten Merkmale weist jedoch die schon fruher beschriebene Gattung *Tucumanus* Pic (Ann. Soc. ent. Belg. XLVII, 1903, p. 300) auf, sodass *Pseudattalus* Champ. als Synonym zu *Tucumanus* Pic betrachtet werden muss. Pic teilt uebrigens meine Ansicht, denn in den Neubeschreibungen ueber 2 Arten aus der Gattung *Tucumanus*, vergleicht er sie mit den bereits beschriebenen *Pseudattalus*-Arten, jedoch ohne die Synonymie zu publizieren.

### Fam. Dasytidae

#### *Dasytes buehreri*, nov. spec.

Koerper dunkel mit bronzefarbigem Metallschimmer, der etwas ins roetliche spielt. Unterseite der beiden ersten, sowie 3. und 4. Glied gelbrot, Maxillartaster gelb, letztes Glied des Tasters schwarz mit der Basus und der aeussersten Spitze gelb; Mittel- und Vorderbeine einfarbig gelb, bei den Hinterbeinen ist der groesste Teil der Schenkel dunkel.

Kopf mit den Augen nur wenig schmaeler als der Halschild, Stirne leicht gewoelbt, zwischen den Augen zwei deutliche laengslaefende Eindruecke, die ziemlich tief sind, sodass der Raum zwischen den beiden Eindruecken beulenartig erhaben erscheint; Punktierung grob und zerstreut, in den Zwischenraeumen chagrinartig gewirkt, laengs dem Augenrande mit einzelnen feinen Runzeln versehen (besonders deutlich vor

den Fuehlerwurzeln). Die Behaarung besteht aus langen, schwarzen abstehenden Borsten, dazwischen vereinzelt mit kurzen, greisen Haaren besetzt. Fuehler kaum laenger als Kopf und Halsschild, ausser dem 1., 3., 4., 5., und letzten Gliede, alle breiter als lang. 1. Glied mit 3 bis 4 laengeren, borstenfoermigen Haaren besetzt, die uebrigen Glieder fein greis behaart. Halsschild nur wenig breiter als lang, in der Mitte am breitesten, auf beide Seiten gleichmaessig verengt, alle Ecken verrundet, Vorderecken etwas staerker herabgedrueckt als die Basalecken, Randung an den Basalecken etwas breiter als an den Vorderecken; Punktierung teilweise noch tiefer und groeber als auf dem Kopfe, Zwischenraeume zwischen den Punkten ebenfalls chagrinartig gewirkt, auf den Halsschildseiten fliessen einzelne Punkte zusammen und bilden mehr oder weniger grosse, grubenartige Vertiefungen. Behaarung wie die des Kopfes, die greisen, anliegenden Haare jedoch zahlreicher. Fluegeldecken ca. 3 mal so lang wie breit, Schulterbeulen deutlich hervorstechend, weil die Decken an dieser Stelle fast unpunktiert sind, Rest der Decken ziemlich dicht, verworren punktiert. Behaarung lang, schwarz abstehend und kurz greis anliegend. Der hautige Anhang an den Klauen ist lanzettfoermig und erreicht die Spitzen der Klauen.

Laenge: 4-4,2 mm.

Fundort: Sorata (Bolivien) 2500 mm, Februar 1941. Type in meiner Sammlung.

Die Art ist auffaellig durch die verschiedene Punktierung von Kopf und Halsschild. Waehrend auf dem Halsschilde die Punkte zerstreut sind und deren Abstand groesser als deren Durchmesser ist, stehen sie auf den Fluegeldecken aeusserst dicht beieinander, die Zwischenraeume sind glatt, auf dem Halsschilde sind die Zwischenraeume chagrinartig gewirkt.

Meinem lieben Freunde, Herrn Alfred Buehrer gewidmet, zur Erinnerung an unseren gemeinsamen Ausflug nach Sorata.

*Dasytes bicoloriceps*, nov. spec.

♂. -- Schwarz, Kopf gelbrot, Stirne am Halsschildvorderrande angedunkelt, schwach metallisch schimmernd, Augen und Oberlippe schwarz. Fluegeldecken mit blaeulichem Metallschimmer; Unterseite des 1. und 2. Fuehlergliedes gelb; Schienen, Tarsen und aeusserste Spitze der Schenkel mehr oder weniger gelb.



Kopf mit den Augen kaum schmaeler als der Halsschild. Zwischen den Augen bis zum Clypeus hufeisenfoermig eingedrueckt. Punktierung fein, ziemlich dicht, Behaarung lang, schwarz. Die Fuehler ueberragen die Schulterbeulen nur wenig, alle Glieder laenger als breit, 2. Glied halb so lang wie das 1., Behaarung vom 3. Gliede an greis, aeusserst dicht und kurz. Halsschild nur wenig breiter als lang, kurz vor der Mitte am breitesten, Basalecken vollstaendig verrundet, Punktierung groeber, tiefer und etwas dichter als auf dem Kopfe, einzelne Punkte fliessen zusammen. Fluegeldecken ungefaehr 3 mal so lang wie an den Schultern breit, jede Spitze fuer sich abgerundet, Schulterbeulen kaum merklich hervortretend, Punktierung erloschen, weniger tief als auf dem Halsschilde.

Laenge: 3,5 mm.

Fundort: Rio Lista, Territorio de Santa Cruz (Argentinien). Type in meiner Sammlung.

Aufgrund der Faerbung (nach Beschreibung) ist die Art in die Naehة von *D. immarginatus* Pic zu stellen, von der sie sich durch groessere Gestalt und zweifarbigen Kopf unterscheidet.

### A new chinch bug from Argentina (Hemiptera : Lygaeidae)

by Carl J. Drake, Ames, Iowa, U. S. A.

This paper contains the description of a new chinch bug from Argentina. It represents the third species of *Blissus* recorded in the literature from that country. The type is in the collection of the author.

#### *Blissus penningtoni*, sp. nov.

Elongate and much slenderer than *B. richardsoni* Drake from Buenos Aires. Antennae very long, moderately hairy; segment I rather stout, moderately short, pale brown; distinctly less than half the length of II; II pale testaceous, brownish towards apex; III testaceous, brown to dark fuscous apically, scarcely stouter than II; IV quite stout, dark fuscous; proportions — I. 8; II, 20; III, 20; IV, 33. Rostrum scarcely reaching metasternum, the first two segments dark brown,

the others mostly testaceous. Legs largely testaceous, the femora stout, especially fore pair. Rostral groove moderately deep on meso- and metasternum. Abdomen beneath reddish brown, the sternum black.

Pronotum finely pitted, shortly pilose, black, the hind margin brownish; proportions: width at base, 52; median longitudinal diameter 40. Hemelytra whitish, with a large conspicuous dark fuscous spot in the apices of corium and clavus; membrane pale, without markings; veins not prominent.

Length, 3.80 mm.; width, 1.10 mm.

Holotype, male, San Roques, Corrientes, Argentina, Feb., 1920, collected by Señor Juan M. Bosq (Ex. Pennington Collection). Named in honor of Dr. M. S. Pennington, who has done so much to increase our knowledge of the Hemiptera of Argentina.

The long antennae and short hairs on pronotum separate this species from *B. bosqi* Drake from Argentina. *B. richardsoni* is a much larger and stouter species with distinctly shorter antennae, but it also has short pilosity. *B. bosqi* has long pale hairs. The elongate form, long antennae and short hairs of pronotum also separate it from the numerous North American members of the genus *Blissus* Klug.

#### Notas sobre abelhas do grupo *Tetrapedia* Klug (Hym. Apoidea)

pelo Pe. J. Moure, C. M. F., Museu Paranaense, Curitiba, Paraná

Estudando material do gênero *Tetrapedia*, acumulado durante vários anos na minha coleção, constateei caracteres que podem servir de base para formar grupos naturais muito homogêneos e relativamente fáceis de separar.

No estudo desse material verifiquei que os exemplares de *Tetrapedia diversipes* Klug, gênotipo, apresentam os palpos maxilares apenas 5-articulados e não com 6 artículos, como se afirma em todas as descrições desse gênero que me foi possível consultar.

Deste fato resulta a revalidação de alguns gêneros, já em parte admitidos por Cockerell.

*Tapinotaspis* Holmberg, colocado por Brèthes (1909 p. 222) na sinonímia de *Tetrapedia*, a meu ver não pertence ao grupo. Segundo a opinião de Bertoni & Schrottky (1910,

p. 566) deveria ser colocado entre os gêneros próximos a *Tetralonia*. Possuo um exemplar macho de *Tapinotaspis chacabucensis* (proc. de Córdoba, Argentina), que concorda com um exemplar visto no Departamento de Zoologia, determinado por Schrottky, e ao qual se aplica em linhas gerais a descrição de Holmberg (1903, pgs. 413-415). Infelizmente o meu exemplar está mutilado, faltando-lhe as antenas; contudo o seu aspeto faz pensar em abelhas do gênero *Exomalospis*, em cuja proximidade talvez deverá figurar.

A posição de *Tetrapedia*, e dos gêneros que agora desmembro, fica bem junto de *Centris* e *Epicharis*, como estabeleceram Vachal (1909, pgs. 7-8) e Ducke (1912, p. 91). Tem esses gêneros de comum, além dos caracteres citados por Vachal, um singular alargamento dos metatarsos anteriores, formado por cerdas notavelmente diferenciadas, dispostas em séries ao longo do bordo anterior interno, aumentando a superfície.

### *Tetrapedia* Klug (s. str.)

Genótipo: *Tetrapedia diversipes* Klug.

Carateres: Escapo mais curto que os três primeiros artículos do funículo juntos. Palpos maxilares mais curtos e apenas com 5 artículos. Asas anteriores com o 1.º nerv. rec. no meio ou antes do meio da segunda célula cubital; esta trapezoidal e quasi tão grande como a primeira; o estigma pequeno. Pernas com os metatarsos dos dois pares posteriores não achatados, mais estreitos que as tíbias respetivas e com longo revestimento cerdoso; o esporão do 2.º par curto e forte, largo, curtamente pectinado anterior e posteriormente; o esporão interno do 3.º par curto, largo na base e largamente pectinado até o ápice; sem pulvilos. Nos machos os metatarsos posteriores geralmente com profundas deformações. Abdómen com o bordo apical dos tergitos mais ou menos claramente chanfrados em ângulo muito aberto, principalmente o 3.º e 4.º. Epipígio do macho largamente emarginado; nas fêmeas a placa epipigial tem um formato agudo-cuspidato.

Não se pode concluir das descrições de Friese, principalmente em sua monografia (1899, pgs. 274-304) quais as espécies pertencentes a *Tetrapedia* (s. str.). Ducke (1910, p. 369) nos dá uma base mais sólida para conjecturar, à primeira vista, sobre a possibilidade de incluir todas as espécies do seu primeiro grupo neste gênero. Abaixo dou uma lista das espécies que examinei pessoalmente:

*Tetrapedia diversipes* Klug, 1810. — ♂ ♀ dos seguintes Estados brasileiros: S. Paulo (S. Paulo, Rio-Claro, Itatiba, Guarulhos, Len-

ções); Paraná (Curitiba e Paranaíba); Goiás (Goiânia, São José do Tocantins, Campinas); Rio de Janeiro (Itatiaia).

*Tetrapedia ornata* (Spin., 1851). — ♀ do Estado de Goiás (Leopoldo-Bulhões).

*Tetrapedia clypeata* Friese, 1899. — ♀ do Estado de Minas Gerais (Mar-de-Espanha).

*Tetrapedia curvitaris* Friese, 1899. — ♂ do Estado de São Paulo (Rio-Claro).

*Tetrapedia peckolli* Friese, 1899. — ♂ do Estado de São Paulo (Guarulhos).

*Tetrapedia xanthostigma* Schrottky, 1913. — ♀ do Estado do Paraná (Curitiba). Esta espécie tem um aspeto muito característico pelo alongado da cabeça.

### *Paratetrapedia*, nov. gen.

Gênotipo: *Paratetrapedia lineata* (Spin.).

Carateres: Escapo mais longo que os 3 primeiros artículos do funículo juntos. Palpos maxilares relativamente longos, de 6 artículos. Asas anteriores com o 1.º rec. junto ao ápice da segunda célula cubital; esta menos fechada superiormente e bem menor que a primeira; o estigma relativamente grande. Pernas com os metatarsos dos dois pares posteriores achatados, tanto ou mais largos que a respetiva tíbia; o revestimento cerdoso muito mais curto, principalmente do lado interno; os esporões do 2.º e 3.º par, inclusive o interno, simples, curtamente multi-pectinados; pulvilos bem desenvolvidos. Nos machos os metatarsos posteriores chatos e semelhantes aos das fêmeas e quando muito com um pequeno dente. Abdómen com a margem apical dos tergitos reta; no macho o epipígio (7.º tergito) é agudo; nas fêmeas a placa epipigial sofre um estrangulamento e depois corre como se fosse outra até o ápice em forma de pequena espátula côncava.

Algumas das espécies deste gênero foram postas por Cockerell (1923, pgs. 449-450) no gênero *Chalepogenus*. A meu vêr, *Chalepogenus* parece ter um sentido mais restrito, como indicam as descrições de Holmberg (1903, pgs. 416-418) e de Schrottky sob o nome de *Desmotetrapedia* (1909, pgs. 223-224). Quanto a *Lagobata* Smith, 1861, é sinónimo de *Tetrapedia* (s. str.), uma vez que o seu genotipo — *Lagobata diligens* — se identifica com *Tetrapedia ornata* (Spinola, 1851), descrita como *Ancyloscelis*, no sentido primitivo de Latreille.

Citamos, abaixo, algumas espécies que comparamos com material determinado por Ducke, Schrottky ou Friese. Contudo, existem divergências nessas determinações dos mestres.

*Paratetrapedia lineata* (Spin., 1851), n. comb. — ♀ do Estado de Goiás (Campinas).

*Paratetrapedia testacea* (Smith, 1854) n. comb. — ♀ do Estado de Goiás (Campinas).

*Paratetrapedia bicolor* (Smith, 1854) n. comb. — ♀ do Estado de Goiás (São José do Tocantins).

*Paratetrapedia amplipennis* (Smith, 1879) n. comb. — ♀ do Estado do Paraná (Curitiba). Comparada com um exemplar determinado por Ducke. No quarto tergito apresenta uma pequena mancha amarela de cada lado.

*Paratetrapedia flavipennis* (Smith, 1879) n. comb. — ♀ do Estado do Amazonas (Maués).

*Paratetrapedia bunshosiae* (?) (Friese, 1899) n. comb. — Espécie muito comum. Exemplares do Estado de São Paulo (Juquiá) e do Paraná (Curitiba, Estr. da Graciosa Klm. 56). Uma interpretação pessoal. O 3.º esternito dos machos, em exemplares bem conservados, aparece completamente revestido de um veludo longo, quando sujo poderia parecer pontuado à vista desarmada.

*Paratetrapedia maculata* (Friese, 1899) n. comb. — ♀ do Estado de São Paulo (Rio Claro). O metatarso posterior tem um pequeno dente basal na frente interiormente.

*Paratetrapedia velutina* (Friese, 1910) n. comb. — ♀ do Estado do Pará (Belém). A descrição desta espécie está em Strand (10, 459-460).

*Paratetrapedia duckei* (Friese, 1910) n. comb. — ♂ ♀ do Estado de Goiás (Campinas). Comparados com exemplares determinados antes da descrição da espécie por Friese (1910, pgs. 62-63).

Tenho ainda várias espécies pertencentes a este gênero, algumas representadas por muitos exemplares, e que ainda não conseguí determinar.

### *Trigonopedia*, nov. gen.

Genótipo: *Trigonopedia oligotricha* n. sp.

Carateres: Escapo mais longo que os 3 primeiros artículos do funículo, dos quais o 2.º é tão longo como o 3.º e 4.º juntos, e o 3.º mais curto que o 1.º. Palpos maxilares de 6 artículos finos, mais longos que os artículos 2-3 do funículo juntos. Maxila com a gálea mais longa que o estipes. Mandíbulas bidentadas no ápice: o dente apical muito grande e robusto, o outro menor e afastado do ápice. Asas com o primeiro nervo recorrente quasi no ápice da 2.ª célula cubital, que é muito estreitada para cima e bem menor que a primeira; o estigma relativamente grande. Pernas com os metatarsos dos dois pares posteriores achatados, e os do último par mais largos que a tíbia e com o lado interno posteriormente em ângulo agudo. O esporão interno do par posterior mais longo que o externo, porém de igual conformação, sendo até a metade mais largamente pectinado; o esporão do 2.º par semelhante ao externo

do par posterior. Unhas com pulvilos. O abdômen oval alongado; os tergitos com os bordos marginais retos; a área epipigial em triângulo isóceles, de vértice um pouco arredondado, a sua superfície transversalmente sulcada como em *Svastra*, *Thygater*, etc. O macho desconhecido.

Este gênero facilmente se separa do anterior pelo formato da placa epipigial e do esporão; ambos do primeiro pelas pernas, esporão posterior e medio, pelos palpos maxilares e abdômen.

Segundo interpretação pessoal, pertence a este gênero a *Tetrapedia glaberrima* Friese, 1899. Exemplares ♀ do Estado de São Paulo (Rio-Claro, e Mogi-das-Cruzes). Entretanto por ser incerta a minha determinação, prefiro dar como genótipo a seguinte espécie que parece nova.

*Trigonopedia oligotricha* n. sp.

♀. — Preto-bruna; as depressões marginais dos tergitos 2-4 um pouco mais claras que o resto; no último par de pernas, a metade apical das tíbias e os metatarsos de cor amarelo-mélea. As asas enfumaçadas, com o estigma amarelento.

Pilosidade nas mandíbulas (lado externo) e labro um pouco ferruginosa; nos lados do clipeo e nas genas branca, no resto da face e vértice algumas cerdas curtas, brunas. O mesonoto coberto com densa pilosidade curtíssima, vista de cima aparece preta e de perfil como geada, lembrando *Puratetr. velutina*; as pleuras com cerdas, não muito densas, escuras, que se vão tornando claras para o esterno; o propódeo nas pleuras com algumas cerdas, no metafragma e área basal com pelos curtos, como os do mesonoto, mais esparsos e visíveis só em certa posição de luz. Uma pilosidade semelhante existe na parte basal dos dois primeiros tergitos, porem um pouco mais forte; nos dois seguintes é mais esparsa e com algumas cerdas curtas; as margens apicais desses 4 tergitos largamente lisas e glabras; o quinto tergito com algumas cerdas curtas até uma franja transversal de cerdas grandes um pouco ferruginosas, depois dessa franja um espaço liso estreito seguido por outra franja apical semelhante a anterior, porém mais densa e mais curta. As cerdas da metade apical da tíbia e do metatarso posteriores pálido-amarelas. Pilosidade ventral branca e notavelmente longa.

*Cabeça* com o afastamento interorbital superior maior que o inferior e menor que o comprimento do olho (102:90:120); distância interocelar quase o duplo da ocelocular (50:26). A pontuação fina e esparsa, os espaços sempre maiores que os

pontos e inteiramente lisos; nos lados da face e nas genas os pontos mais finos e mais densos; na fronte mais densos que no clipeo. O occiput rebordado e as genas mais estreitas que os olhos. *Tórax* com o pronoto sem reborde, porém com os ângulos em dente obtuso, bem salientes; o conjunto visto de cima forma um trapézio muito achatado; o pronoto mate, as propleuras pontilhadas densamente, porém mais brilhantes. O mesonoto com a escultura coberta pela densa vilosidade, aparecendo vestígios do sulco médio e dos laterais, os parapsidais um pouco mais marcados (removendo a pilosidade, aparece a superfície lisa densamente crivada de pontinhos mais finos que os da fronte); o escutelo como o mesonoto; o postscutelo mais liso; as mesopleuras muito lisas e com pontos semelhantes aos do clipeo, porém mais esparsos, principalmente na parte infero-posterior; as metapleurais lisas, com pontinhos insignificantes. O propódeo com a área basal indistintamente separada das pleuras e do metafragma, todo liso e brilhante com pontinhos finos e densos como nas genas. Asas e pernas normais. Abdômen com todo o 1.º tergito (excepto uma estreita faixa apical lisa) e a metade basal do 2.º densamente coberto por fina pontuação pilígera, que torna essas partes um tanto mates; a metade basal do 3.º e 4.º com pontos mais grossos e mais esparsos, mas a parte correspondente às depressões marginais absolutamente lisa. O ventre com pontos pilígeros.

Comprimento total 8,5 mm.; largura da cabeça 2,6 mm., do abdômen 2,9 mm.; comprimento da asa anterior 8,2 mm.

Habitat: Holótipo e 9 parátipos de Rio-Claro (Est. São Paulo) P. F. S. Pereira leg., IX-1939; 1 parátipo de Itaoca, J. F. Zikán leg., 23-XII-1936.

Holótipo e 5 parátipos na minha coleção; 2 parátipos no Departamento de Zoologia (S. P.), 1 parátipo no Instituto Biológico (S. P.), 1 parátipo no Museu Paranaense, 1 parátipo na col. Zikán.

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### Further new species of Neotropical Hesperiidae from Ecuador (Lep.)

by Kenneth J. Hayward, Estación Experimental Agrícola,  
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(With 14 figures)

Correction. — In my previous paper on this subject (Rev. de Entom. 11, 1940) on page 875, owing to a printer's error, a line was dropped from the description of *Tigasis nigrans*. For «Holotype and paratypes deposited in the collection of the Academy etc.». read «Holotype and paratypes deposited in the collection of the American Museum of Natural History, paratypes deposited in the Academy of Natural Science, Philadelphia».

#### *Aethilla maxima*, nov. sp. (Fig. 1)

♂. — Expanse alar 62-66 mm.

Dark velvety coffee brown, the basal half of the forewing dark brown to dark blackish brown, the distal edge of this area slightly irregular. Beyond this dark basal area a similar coloured thick irregular line, strongly angled outwardly from the costa to  $M_1$  and then continued, thicker, to the inner margin, very slightly curved towards the base. A somewhat similar, less compact, submarginal line, parallel to the just described postmedian line, across the apex of the wing, thereafter parallel to the outer margin, this submarginal line not quite uniting with the postmedian line before the inner angle. In some specimens these two dark lines are absent from, or very lightly defined in, the costal and subcostal area of the wing. The hindwing of the same colour as the basal area of the forewing with a lighter area across the



centre of the cell, preceded in some specimens by a lighter blotch at the costa and a lighter submarginal line, somewhat removed from the margin, broken up into small patches by the veins and tapering slightly towards the anal angle. Basad to the line in the cubital cells, a wedge of the same colour. In dark specimens these lighter areas are scarcely discernible. On both wings slight greyish-blue dusting, forming a thick short line on the forewing between the postmedian and the submarginal dark lines between  $M_2$  and the inner angle and very marked along the costa, along the lighter submarginal line and in the anal cells of the hindwing. This dusting disappears as the insect becomes worn. Beneath as above but the outer half of the forewing of a lighter somewhat yellowish brown, the submarginal line in some specimens forming a dark border to the wing without the intervening lighter area, the inner margin of the forewing with a greyish-blue (almost lilac) distinct sheen, which is less apparent over the whole of the hindwing.

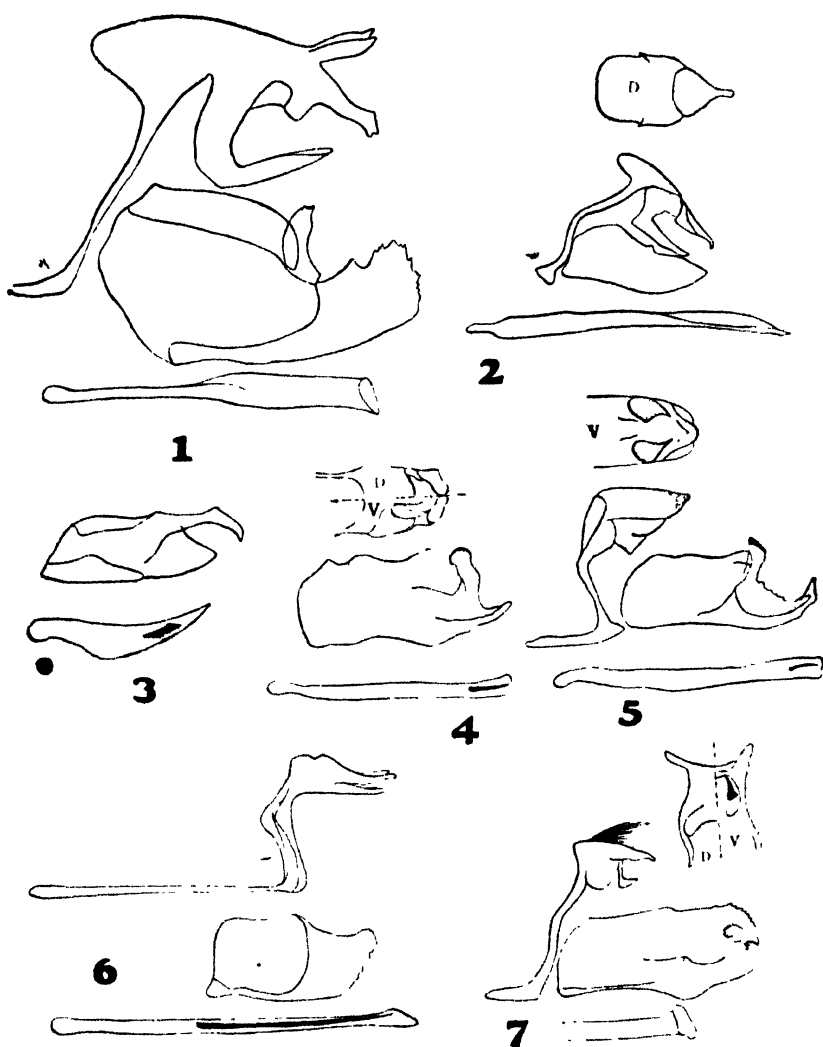
Head, thorax and abdomen above and below dark brown, the abdomen dorsally and laterally covered with bluish dusting. Antennae dark brown, the under side of the club and apiculus greyish. The palps dark brown. Eyes bronze.

Described from 2 ♂♂ from «Ecuador» and a ♂ from Satipo in Peru, all in my collection. Mr. Bell states that there are two ♂♂ from the vicinity of Baños (Abitagua, Rio Pastaza), Ecuador, 1100-1200 m., in the collection of the American Museum of Natural History, and the drawing of the male genitalia sent me corresponds with that of the specimens here described.

*Quadrus chalybaeus*, nov. sp. (Fig. 2)

♂. — Expanse alar 38 mm.

Allied to *adamantinus* but larger and blacker, the maculation larger. The upper side blackish brown, almost black, slightly peppered with yellow scaling, on the hindwing blue scaling forming a bar from the cell to the anal margin in the disc of the wing and beyond, a less distinct stripe from the median cell to before the anal angle, postdiscal. The white transparent maculation of the forewing consists in a group of four preapical roundish spots, two along the costa, a third below forming a triangle with the costal pair and a



## Male genitalia :

Fig. 1. *Aethilla maxima*. — Fig. 2. *Quadrus chalybaeus*. — Fig. 3. *Zopyrion subvariegata*. — Fig. 4. *Atrytone cocepi*. — Fig. 5. *Lerodea sylva*. — Fig. 6. *Lerodea williamsi*. — Fig. 7. *Lerodea oasta*. (All are type specimens from Ecuador. V, ventral and D, dorsal view of the uncus, etc.)

fourth slightly further removed from the costa, slightly distad to the remainder. An elongate dash in the upper part of the centre of the discoidal cell with a similar slightly shorter dash between it and the costa, slightly basad. In the disc of the wing five spots, a minute spot just above the median within the cell and directly below the basal end of the cell streak, and beyond the dot a larger spot below the distal

end of the streak. In the upper cubital cell a slightly triangular spot based on  $Cu_2$  and reaching to the base of  $Cu_1$ , a dash across the lower median cell before the apex and between this and the distal spot of the preapical group another minute spot. Beneath the forewing as above but lighter, the inner marginal area still lighter, the basal area strewn with blue scaling. The hindwing covered with dark blue scaling except for the extreme margin, a small dash across the anal cells from the angle and a roundish wedge comprising the apex and extending downwards to the upper median cell.

Head, thorax and abdomen brown, greyish beneath, the palps white beneath.

Described from a ♂ from the Rio Topo (1150 m.), in the Province of Oriente, Ecuador. Mr. Bell states that there is in the collection of the American Museum of Natural History a specimen from the vicinity of Baños, and the male genitalia of this insect compares with that of the insect here described.

*Zopyrion subvariegata*, n. sp. (Fig. 3)

♂. --- Wing expanse 28-30 mm.

Upper side blackish brown, slightly darker in the cell, slightly lighter towards the outer margin, the fringes greyish interrupted brown at the veins. Beneath the forewing brown, the inner marginal area narrowly grey, a patch of grey scales before the apex and continued in the form of a few scattered grey scales to the inner angle, a thin brown line along the margin. Hindwing a very slightly lighter brown and peppered with grey scales. A postbasal and postdiscal darker band united in a curve before the costa forming an irregular «U», the open side resting on the lower anal vein, the outer distal edge of the postdiscal band somewhat lunate inwardly between the veins. A double marginal light-brown line and on the somewhat lighter area between the marginal line and the postdiscal band, a row of darker round spots.

Antennae brown, grey below. The palps above with dark brown hairing, below white at the base.

Described from two ♂♂ (Naranjapata 1850 ft., Coxe y, XI. 1926 and Huigra, Rhoads, 1911), from Ecuador. The Naranjapata cotype in the collection of the Academy of Natural Sciences, Philadelphia, the Huigra specimen in my collection.

*Zopyrion subvariegata inornata*, nov. fa.

♂. — Wing expanse 29 mm.

Upperside as in *subvariegata*. Beneath dark brown, very slightly lighter before the apex and along the inner margin of the forewing, the hindwing without any markings. Both wings somewhat lustrous. Otherwise as in *subvariegata*.

Described from a ♂ from Ecuador in my collection.

It is difficult to imagine that *inornata* and *subvariegata* are the same species taking into consideration their external appearance. However their genitalia correspond in every respect and it is better that *inornata* should figure as a form of *subvariegata* until such time as more definite proof of the affinities of these specimens is available.

*Atrytone coxei*, nov. sp. (Fig. 4)

♂. — Wing expanse 27 mm.

Upper side brown. On the forewing two subapical dashes, the upper composed of a few scattered scales. A row of three postdiscal yellow spots pointed basally and sharply concave distally, above the upper spot a minute yellow dash. The hindwing with a slight postdiscal yellow patch. Fringes yellowish, shading outwardly to grey. Beneath light coffee brown, the veins lighter, more yellowish. The disc and inner marginal area of the forewing blackish, the subapical dashes faintly and the two upper spots distinctly marked, yellow.

Antennae black, slightly ringed yellow, the apiculus and lower side of the club yellow. Head, thorax and abdomen dotted with yellowish hairs. The palps mainly yellowish. Legs a deeper yellow than the hairing of the thorax and abdomen.

♀. — Wing expanse 30 mm. The yellow dash above the upper discal spot, and the lower discal spot, absent. The yellow discal spot of the hindwing reduced and not at all prominent beneath as in the male.

The ♂ type from Bucay (975 ft.) and the ♀ type from Baraganatal, both in Ecuador. The type specimens are in the collection of the Academy of Natural Science of Philadelphia and I have had much pleasure in naming this species for the discoverer of the male type, Mr. Judson Coxey.

*Lerodea sylva*, nov. sp. (Fig. 5)

Amongst some 36 unidentified specimens of hesperids from Ecuador contained in the collection of the Academy of

Natural Science of Philadelphia and sent to me for examination by Mr. Roswell Williams (jr.), were five specimens of a *Lerodea* very similar to *noctis* Pl. Before comparing them with the series of *noctis* in my own collection I luckily made genitalic preparations, otherwise I should most certainly have placed these specimens to *noctis*, as I have been unable to discover any stable difference between the species here named and the Plötz species. Having noted the difference in the genitalia of the Academy specimens and my slides of *noctis*, I proceeded to dissect all my male *noctis*, finding amongst them further specimens from Ecuador of the species here described.

A careful comparison of all the material of these two species available does not indicate any certain method of separating the species except by dissection, but the yellow maculation in *sylva* is in all cases either absent or very reduced. The valves are somewhat similar in shape but the lower lobe is considerably produced in *sylva* and there are other differences. It may be added that the two types of genitalia are constant and that the two species fly together.

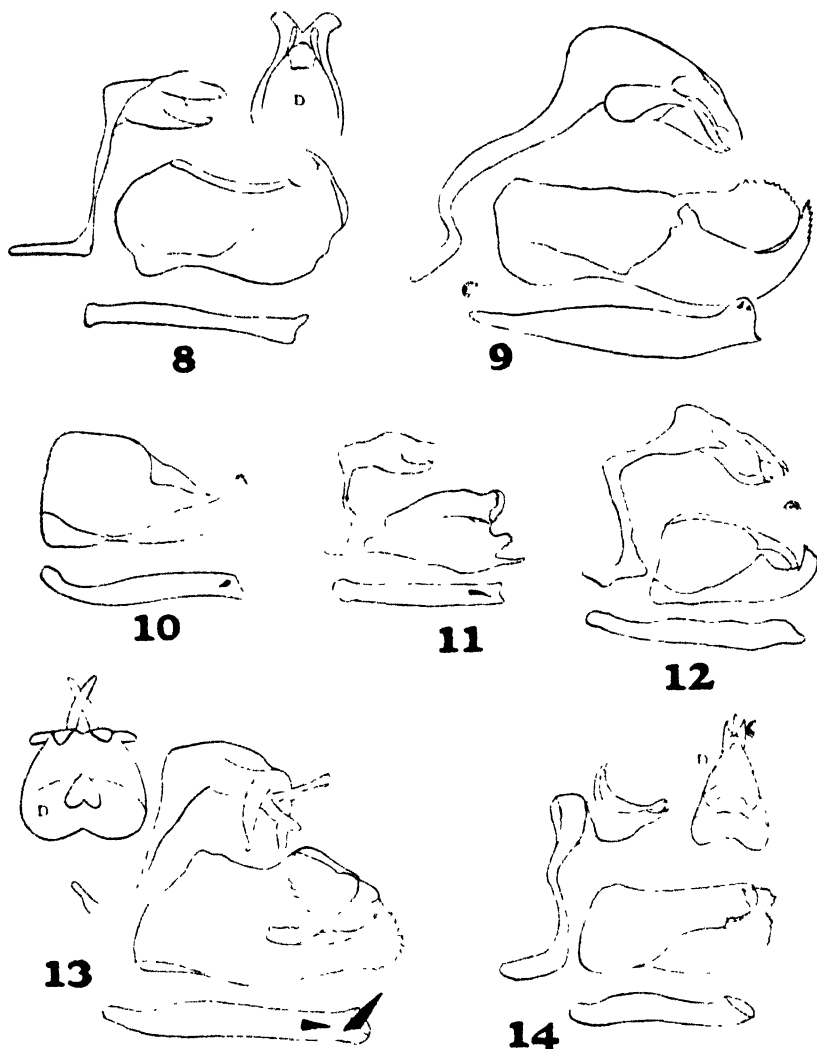
Described from 5 specimens (♂♂ and ♀♀) from the Rio Topo, 1050 m., (Brown), in my collection, ♂ Huigra, 4000 ft. (Coxey), ♂ Hacienda La Mascota, Rio Topo, 4500 ft. (Coxey) and a ♀ from Muzo, Colombia, the latter specimens in the collection of the Academy of Science of Philadelphia.<sup>1</sup>

*Lerodea williamsi*, nov. sp. (Fig. 7)

♂. — Wing expanse 26 mm.

Upper and lower sides of both wings dark brown without any visible markings, the forewing underside slightly lighter at the apex and outer margin, the fringes brown. Head, thorax and abdomen blackish brown. Antennae brown, the joints, especially the basal half of the club, very slightly ringed yellowish, under side of the distal half of the club

(1) Since the above was written, my friend Mr. R. C. Williams (Jr.), of the Academy of Natural Sciences, Philadelphia, has revised the series of "*noctis*" in the collection of that Institution, and has found that a proportion of these insects were really the here described *sylva* and that this new species is represented from Villa Rica in Paraguay, Santha Catharina in Brazil, Charumazu in Peru and from Kwakoeegron and the Saramacca River. (K. J. H.)



## Male genitalia :

Fig. 8. *Euroto incompta*. — Fig. 9. *Molo humeralis*. — Fig. 10. *Phlebotomus thisbe*. — Fig. 11. *Entocus phylla*. — Fig. 12. *Molo kenava*. — Fig. 13. *Molo conspicua*. — Fig. 14. *Mnasicles thymoctes*. (All drawn from Ecuador specimens. Numbers 8, 10, 11, 13 and 14 type specimens. D, dorsal view of the uncus, etc.)

and of the apiculus yellow. Frons, palps and shoulder covers brown with a few yellowish hairs. Legs brown, the tibiae with slightly iridescent scaling.

Not to be distinguished from many other *Lerodea* except by the different genitalia.

Described from a male, Huigra, March 1911, S. N. Rhoads. In the collection of the Academy of Natural Sci-

ence, Philadelphia. Named for my friend Mr. Roswell Williams.

*Lerodea casta*, nov. sp. (Fig. 6)

Wing expanse 26 mm.

Wings uniformly brown, immaculate, the upperside of a slightly darker tone. Fringes of the ground colour becoming more greyish on the hind wing towards the anal angle. Head, thorax and abdomen blackish brown, the thorax with a few dirty-pale-yellowish hairs beneath. Antennae brown, lightly scaled yellowish on the lower side of the basal half of the club and of the apiculus. Palps brown above, below brown and dirty pale yellowish hairscales about equally mixed. Legs brown, on their lower side more greyish.

This is yet another of the numerous similar small brown hesperids that can only be separated into their species by examination of the genitalic organs.

Type ♂ from Naranjapata (1850 ft), Ecuador (Coxey), in the collection of the Academy of Natural Science, Philadelphia.

*Euroto incompta*, nov. sp. (Fig. 8)

♂. -- Expanse alar 28 mm.

Above dark brown, the basal hairing and a few scattered scales more reddish brown. Fringes concolorous. Beneath dark brown, somewhat more reddish than above. The forewings with a few scattered yellow scales, especially in the subcostal area and at the upper angle of the discoidal cell (where they form a small patch). The veins of both wings lighter, yellowish. Head, thorax and abdomen of the ground colour with similar somewhat reddish brown hairs. The antennae are missing from the type. Palps dotted with brown greyish and greenish-yellow hairs, the latter predominating. Head and collar with mixed yellowish and brown hairs. Tegulae brown with a tuft of yellow hairs at the base. Legs with intermingled brown and whitish-yellow hairs.

Described from one ♂ from Dos Puentes, Ecuador, (Km. 99, 1700 ft. Coxey), in the collection of the Academy of Natural Science of Philadelphia.

*Phlebodes thisbe*, nov. sp. (Fig. 10)

♂. — Wing expanse 25 mm.

Above brown, The subcostal area yellowish, a thin yellow stripe in the upper part of the discoidal cell, the base with scattered yellow scaling, one elongated yellow subapical dash and a postdiscal row of three yellow spots, that in the angle of the lower median triangular, the two lower spots quadrate and touching the velvety black stigma. The fringes lighter than the ground colour, gradually changing to yellowish towards the anal angle. Hindwing brown with five large elongate yellow postdiscal intercellular spots separated by the brown veins. Beneath both wings yellow peppered with scattered ochreous scaling. The forewing with the base, disc, inner marginal area and the inner angle blackish on which shows the upperside maculation, the lower postdiscal spot elongate, whiter, somewhat indefinite. The subapical dash shows faintly.

The hindwing with the anal fold blackish and the postdiscal band of spots showing faintly. Head thorax and abdomen black above, the thorax grey beneath. Antennae brownish above with heavy yellow scaling between the joints, below mainly yellow, the apiculus brown beneath. Palps, frons, collar and tegulae mainly brown with lighter yellowish hairs intermingled. Legs black with grey hairs on the femur, the tibiae and tarsi yellowish.

Described from a ♂ from Bucay, Ecuador, (975 ft. Coxey), in the collection of the Academy of Natural Science of Philadelphia.

*Eutocus phthia* Godman (Fig. 11)

Wing expanse 22 mm.

♂♀. — Wings above rich dark brown, immaculate, slightly more reddish brown at the basal half of the costa. Beneath similar but of a slightly more reddish tone, forewing of the male type slightly lighter towards the outer margin. The fringes dark brown. Head, thorax and abdomen and all appendages concolorous with the wings, the underside of the antennae slightly lighter, somewhat yellowish. Palps beneath with intermingling yellowish and greyish hairs.

A male from Naranjapata (1850 ft. Coxey) and female from Huigra (Rhoads), both in Ecuador, appear to



be this species although the male genitalia is very slightly different from the Godman drawing.

*Molo kenava* Butler (Fig. 12)

A drawing of the male genitalia is here given. This species will eventually have to be removed from this genus with which it is not congeneric. Ecuadoran specimens were received from Baños and the Rio Blanco (Macintyre), Uyumbicho, Runtún, Baños and Hacienda Talahua (Brown) and from the Rio Ulva and San Antonio (Schilling).

*Molo humeralis* Mabille (Fig. 9)

A drawing of the male genitalia of what I take to be this species is here given. Specimens were received from Ecuador from the Rios Verde and Topo and from San Francisco (Macintyre).

*Molo conspicua*, nov. sp. (Fig. 13)

Wing expanse 32 mm.

Black; the fringes yellow, long at the anal angle. The subcostal area of the forewing in the basal third yellow, this colour extending into the cell. A wide yellow discal bar across the forewing from the inner margin to the first median nervure, beyond which from the proximal upper angle, a yellow spot united to the transverse bar. Both edges of this transverse band serrate, the band tapering very slightly from the inner margin upwards, the macula in the first cubital cell slightly paler, especially in the female. Hindwing with a very broad yellow median band from the black border to the first median nervure, extended into the base of the wing along the underside of the upper anal nervure.

Beneath, both wings of a lighter yellow, well peppered with dull reddish-brown scales which are accumulated to form small roundish subapical spots on the forewing, a costal and an irregular row of postdiscal spots on the hindwing and a submarginal row of spots on both wings. Cell and base of forewing, the inner margin and an extensive curved area before the inner angle of the forewing, and the anal cells of the hindwing, black.

Antennae mostly yellow with some black scaling on the upperside. Head and thorax with yellow hairs intermingled

with dark reddish brown. Abdomen black. Palps yellow beneath, yellow and brown above. Legs and ventral side of the thorax yellow, the legs more reddish, abdomen beneath dirty yellow.

Holotype male and allotype female from Ecuador (Hda. Talahua, Prov. of Bolivar, 900 m., Martin Brown), in my collection.

*Mnasicles thymoetes*, nov. sp. (Fig. 14)

Wing expanse 30 mm.

Above deep reddish brown, slightly lustrous, immaculate, the fringes of the same colour. Beneath the forewing rather more blackish brown, the subcostal area reddish brown. Hindwing more reddish brown, especially towards the anal angle, without markings. Head, thorax and abdomen dark blackish brown above and beneath. The palps brown, lightly peppered with greyish hairs. Antennae missing from the type. Frons with brown hairs intermingled with greenish blue. Collar mostly greenish blue with a few brown hairs. Tegulae brown. Legs brown, the tibiae with a ventral fringe of mainly reddish brown hairs.

Described from a ♂ from Baños, Ecuador, in the collection of the Academy of Natural Science of Philadelphia.

**Uma especie nova de *Symphylurinus* (Diplura, Projapygidæ) do Brasil**

por P. W. Wygodzinsky, Rio de Janeiro

(Com 12 figuras)

Nesta nota descrevemos o macho duma espécie nova de *Symphylurinus* da coleção do Dr. Roger Arlé. Agradecemos muito ao Dr. Arlé por ter cedido este exemplar para estudo.

*Symphylurinus arléi*, sp. n. ♂

Fêmea desconhecida.

Comprimento 2.2 mm.

Antenas com 23 artículos; 2.<sup>o</sup> artículo alargado (fig. 1), com 3 processos lanceolados mais ou menos iguais; os outros artículos (fig. 2) com numerosas cerdas e tricobotrias.

Pronoto (fig. 3) com  $4+4$  macrochetas, m. estas com 1—3 ramificações finas. Mesonoto (fig. 4) com  $8+8$  m., também pouco ramificadas. Metanoto (fig. 5) com  $5+5$  m. do mesmo tipo. Superfície dos notos (figs. 3, 4, 5) com cerdas relativamente compridas e pouco numerosas.

Cerdas do 3.º par de patas vide fig. 6.

1.º tergito abdominal com  $1+1$  m. anteriores e  $1+1$  m. posteriores; 2.º tergito com  $1+1$  anteriores e  $2+2$  posteriores; 3.º com  $2+2$  anteriores e  $3+3$  posteriores; 4.º até 6.º com  $4+4$  posteriores (fig. 7); 7.º com  $4+4$  anteriores e  $3+3$  posteriores; 8.º e 9.º (fig. 8) com  $3+3$  posteriores. Macrochetas dos últimos segmentos com 2 ou 3 ramificações curtas e fortes. 10.º tergito quasi retangular (fig. 9), com numerosas cerdas (mais do que  $12+12$ ).

1.º esternito abdominal (fig. 10) com  $3+3$  m. anteriores bastante ramificadas e  $4+4$  m. posteriores menos ramificadas. Esternitos II — VII (fig. 11) com  $2+2$  m. anteriores e  $5+5$  (ou  $5+6$ ) m. posteriores. Processo do primeiro esternito (fig. 10) não mais comprido do que largo, com cerdas finas e a porção apical com muitas sensilas delicadas.

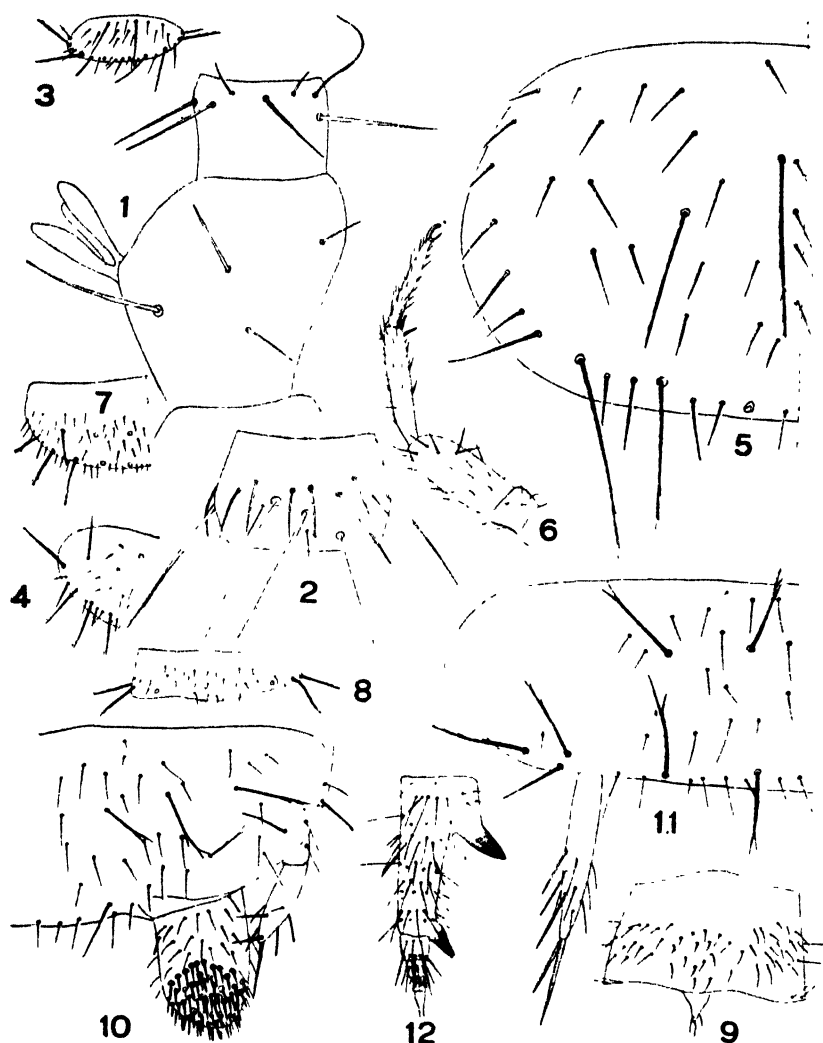
Cerci fortes; cercus à esquerda (o outro está quebrado) com 4 artículos, sendo o primeiro quasi duas vezes mais comprido do que os outros juntos, e tendo dois dentes, sendo o dente basal mais forte do que o distal (fig. 12).

Localidade: Mangaratiba, Estado do Rio, Rubião, Caminho de Toca, 600 m, II-1938, Roger Arlé leg.

Observação: O macho da presente espécie se assemelha ao macho de *Symphylurinus paratus*, mas pode ser facilmente distinguido pela armadura da antena, armadura esta composta no *paratus* de duas cerdas fortes e um só processo lanceolado. *Arléi* se distingue de *tristani*, outra espécie também visinha, pelo menos pela distribuição diferente das macrochetas dos tergitos abdominais.

A seguinte chave facilita a determinação das espécies de *Symphylurinus*.

1. Mesonoto com  $9+9$  macrochetas; 1.º tergito abdominal com  $2+2$  m. posteriores . . . . . *grassii* Silv.
- Mesonoto com numero menor de macrochetas; 1.º tergito abdominal sem ou com  $1+1$  m. posteriores . . . . . 2
2. Mesonoto com  $6+6$  m. . . . . *perceptus* Silv.
- Mesonoto com  $7+7$  m. . . . . 3
- Mesonoto com  $8+8$  m. . . . . 5



*Symphylurinus arlfi*, n. sp.

Fig. 1. 2.<sup>o</sup> e 3.<sup>o</sup> articulo da antena. — Fig. 2. Articulo mais distal da antena. — Fig. 3. Pronoto. — Fig. 4. Mesonoto. — Fig. 5. Metanoto. — Fig. 6. Pata do 3.<sup>o</sup> par. — Fig. 7. 5.<sup>o</sup> tergito abdominal. — Fig. 8. 6.<sup>o</sup> tergito abdominal. — Fig. 9. 10.<sup>o</sup> tergito abdominal. — Fig. 11. 6.<sup>o</sup> esternito abdominal. — 12. Cercus à esquerda.

3. Metanoto com 4+4 m.; 1.<sup>o</sup> tergito abdominal sem m. posteriores  
*discretus* Silv.
- Metanoto com 5+5 m.; 1.<sup>o</sup> tergito abdominal com m. posteriores . 4
4. Macrochetas da margem posterior do metanoto quasi do comprimento das cerdas dorsais posteriores; tergitos abdominais IV — VII com um total de 8+8 macrochetas . . . . . *indicus* Silv.
- Macrochetas do margem posterior do metanoto muito mais compridas do que as cerdas dorsais posteriores; tergitos abdominais IV — VII com um total de 7+7 macrochetas . . *travassosi* Silv.

5. 2.<sup>o</sup> tergito abdominal com 3+3 m. posteriores; artículos dos cerci da fêmea com um só anel de cerdas fortes . . . *simplex* Silv.
- 2.<sup>o</sup> tergito abdominal com 2+2 m. posteriores; artículos dos cerci da fêmea com as cerdas acima mencionadas e um anel de cerdas finas . . . . . 6
- 6 Tergitos abdominais VIII-IX com 5+5 cerdas cada um . . . . .  
*peregrinus* Silv.
- Estes tergitos com 3+3 ou 4+4 m. cada um . . . . . 7
7. Tergitos abdominais IV-VI com um total de 9+9 m. cada um . . . . .  
*occidentalis* Silv.
- Estes tergitos com um total de 7+7 ou 8+8 m. cada um. . . . . 8
8. Tergito abdominal III com um total de 5+5 m; tergito VII com um total de 7+7 m. . . . . *arlei* sp. n.
- Outra distribuição das m. nos tergitos abdominais . . . . . 9
- 9 Tergito III com um total de 8+8 m. . . . . *orientalis* Silv.
- Este tergito com um total de 6+6 m. . . . . 10
- Este tergito com um total de 4+4 m; ápice do apêndice do 1.<sup>o</sup> esternito abdominal da fêmea com duas cerdas claviformes . . . .  
*lutzi* Silv.
10. 9.<sup>o</sup> esternito abdominal sem macrochaetas . . . *tristani* Silv.
- 9.<sup>o</sup> esternito abdominal com 2+2 macrochaetas . . . *paratus* Silv.

*Symphylurinus grassii* var. *aethiopica* Silv. não foi incluído nesta chave, sendo descrito insuficientemente.

### Six new Costa Rican Scarab beetles of the genus *Phyllophaga*\*

by Lawrence W. Saylor, U. S. Fish and Wild Life Service,  
Washington, D. C.

#### *Phyllophaga* (*Phyllophaga*) *nevermannae*, n. sp.

Male. — Robust-oval, quite large; piceo-rufu-castaneous in color, slightly shining; dorsal surface entirely griseo-pilose, hairs of head longer. Clypeus flat and moderately long, apex faintly reflexed and center very narrowly and very slightly sinuate, the angles very broadly rounded; disc with very coarse, irregularly-placed punctures, each with a short erect hair. Front coarsely, rugosely, very densely and contiguously punctate, the punctures of varying size and with short erect hair. Antennae 10-segmented, unicolorous rufous; club very long, nearly a third longer than the entire stem; segments 2-3 globose, 4-7 spinose inside, the 7th really sub-flabellate since it is about six times wider than long. Thorax and

elytra extremely finely, very densely and entirely punctured, with short, very fine and silky, procumbent pile. Thorax with sides slightly dilated, margins ciliate and entire, subparallel behind and convergent and straight apically; front angles rectangular and slightly produced, hind angles obtusely angulate. Elytra with all striae absent, the sutural weakly indicated. Pygidium and abdomen punctured as elytra, the punctures very dense and extremely fine and all with short procumbent pile. Pygidium with a few longer hairs in the apical half of disc and the entire apex subrounded and ciliate. Abdomen flat, very faintly longitudinally flattened; 5th sternite with a small central patch of subgranulate punctures, and each side of the patch with an oblique, weakly indicated transverse carina running nearly to the sides of the sternite; 6th sternite half the length of the preceding, disc transversely flattened, center with a small smooth spot which is faintly longitudinally sulcate, the surface punctured as rest of abdomen; sternites 2-5 inclusive with the marginal lines between them very weak at and near the center, but well marked near the sides. First segment posterior tarsus a little shorter than second and spurs free. Genitalia bilaterally symmetrical and of the complete ring-shaped type; in enface view the lateral angles are well separated but not well indicated, and the small central process below them is bidentate and the teeth slightly separated. Tarsal claws with basal and apical teeth long and equal in size, basal tooth slightly indexed basally, base noticeably, almost rectangularly dilated.

Female. — Antennal club one-fifth longer than the funicle, pygidium slightly more flattened than male and the abdomen slightly convex and not flattened, the 5th and 6th segments nearly flat and punctured as the other abdominal sternites; first two posterior tarsal segments subequal. Otherwise similar to male. Length 29-31 mm.

The holotype male and allotype female which remain in the Saylor Collection, are from «La Palma, 1500 M, Costa Rica, F. Gongora collector, March 23, 1924, F. Nevermann collection.» It is a pleasure to name this fine species in honor of the late Mr. F. Nevermann who presented the specimens to me some years ago. A paratype female is also in my collection from «Costa Rica,» and is marked «*P. gigantea* Bates, compared with type.»

This species is the largest in the genus as yet described and is one of the few in which the female antennal club is longer than the funicle. Though related to *P. gigantea* Bates, this species is abundantly distinct in the male through the shape of the genitalia and the dorsal sculpturing, and in the female by the antennal club, which in *gigantea* is shorter than, and in *nevermannae* is longer than, the funicle.

*Phyllophaga (Phyllophaga) guapiles*, n. sp.

Male. — Oblong-ovate, wider behind; color piceocastaneous, somewhat dull; above completely haired. Clypeus broad and very transverse, the apex very faintly sinuate, the angles broadly rounded and hardly reflexed; disc very densely finely punctate, with very short erect hairs. Front with dense, somewhat coarse variolate punctures, the erect pile moderately long. Antennae 10-segmented, rufotestaceous; club testaceous, short, equal in length to segments 3-7 combined. Thorax with sides dilated, ciliate, slightly crenate behind and faintly sinuate; front angles bluntly rectangular, not produced, hind angles obtusely angulate; disc with fine, very dense, regularly placed punctures, each separated by once their diameters, the punctures very dense and nearly contiguous near sides. all punctures with short erect hairs, without noticeable longer intercalated hairs. Elytra with four striae, other than sutural, weakly indicated; entire surface extremely finely and subrugosely punctured, with short procumbent griseous pile, and several slightly longer hairs near scutellum. Pygidium entirely, extremely-densely punctate, with short erect pile and a very few longer hairs in apical portion; apex subtruncate. Abdomen convex, highly polished and with sparse, minute setigerous punctures at middle; 5th sternite declivous behind, densely and setigerously punctate; 6th sternite half the length of 5th and transversely sulcate, the basal margin slightly thickened and entire, the disc very faintly, longitudinally sulcate and with fine, dense, setigerous punctures. First segment hind tarsus shorter than second; spurs free. Claws short, the basal tooth as long as apical tooth and slightly inclined towards the faintly dilated base. Outer edge middle tibia faintly serrate. Genitalia of the complete ring-shaped, bilaterally symmetrically type; in enface view the lateral angles are not obvious and the central under piece is broad, moderately long, and faintly and obtusely bidentate at apex. Length 15.5 mm.

The unique male holotype in the Saylor Collection is from «Guapiles, Sta. Clara, Costa Rica, 250-300 m, collected April 24, 1934 at light.»

This species is close to *P. grossepunctata* Moser but differs especially in the shape of the clypeus and in the type of dorsal hairiness.

*Phyllophaga (Phyllophaga) crena*, n. sp.

Male. — Oblong-ovate; color rufocastaneous and shining above. elytra faintly pruinose, the thorax somewhat more rufous; above completely haired. Clypeus short, and nearly semicircular, apex entire and reflexed; disc coarsely and densely setigerously punctate. Front coarsely and very densely punctate. with short erect hairs. Antennae 10-segmented, rufocastaneous; club testaceous, and very faintly longer than the funicle. Thorax with sides roundly dilated in front of middle, entire in front and crenate behind, the sides also subparallel behind; central disc with fine, dense punctures separated on disc by more than once, to nearly twice, their diameters and a little closer at sides; all punctures with short and erect hair and a good many scattered longer hairs over the entire dorsal surface; front angles bluntly obtuse, hind angles nearly rectangular. Elytra ecostate other than sutural; disc densely punctate and with short semicrest hair, with longer hairs near base. Pygidium slightly convex, polished, faintly pruinose at base; disc finely densely and rugosely punctate and with very short and short erect hairs; apex subtruncate and reflexed. Abdomen flattened, subpruinose, sparsely and setigerously punctate, the middle faintly longitudinally impressed; 5th sternite faintly transversely impressed at apex center with a dense patch of granulate punctures, the suberect hairs rather short; 6th one-half the length of 5th sternite, the base and apex subcarinate, thickened and very faintly interrupted at middle, the disc transversely impressed, subgranulately and sparsely punctate, and with a faintly indicated longitudinal sulcus. First segment hind tarsus much shorter than second; spurs free and graceful. Claws moderately long, the basal tooth submedian and as long as the apical tooth, the claw base slightly and very obtusely dilated. Genitalia bilaterally symmetrical and of the complete ring-shaped type; in enface view the lateral angles are acute and slightly extended, and



the median underprocess consists of two slender, moderately long, and subparallel teeth.

**Female.** — Antennal club equal to segments 3-7 in length; pygidium flat, entirely densely punctate and with short erect hairs, the apex subtruncate; abdomen flat, densely punctate, 5th and 6th sternites plane and densely, coarsely, setigerously punctate; claws somewhat shorter than male; otherwise similar to male. Length 14.5-15.5 mm.

The holotype and two paratypes, all males, and the allotype female remain in the Saylor Collection. A single male paratype is in the U. S. National Museum. They are from «San José, Costa Rica, March 14-15, 1935, at light, F. Nevermann coll.»

*P. crena* differs from *P. wittkugeli* Nonfried in the quite different thorax and from *P. grossepunctata* Moser in the abdominal characters and nonsinuate clypeus.

*Phyllophaga (Phyllophaga) coronadis*, n. sp.

**Male.** — Oblong-oval, wider behind, color dark castaneous and strongly polished; above sparsely haired. Clypeus moderately long, the entire disc somewhat convex, the apex not reflexed and slightly sinuate, the angles very broadly rounded; disc with coarse punctures which are dense in basal half, the apical half smooth and irregularly punctate. Front with very coarse nearly contiguous punctures but hardly rugose, the punctures with long erect hairs; clypeal suture very fine, very nearly evenly rounded except for a very slight median sinuation. Antenna rufous, 10-segmented; club quite ovate, equal to segments 4-7 combined. Thorax with sides very strongly, roundly dilated, ciliate, and straight; angles very obtuse; disc with coarse sparse punctures irregularly placed and separated by one to three times their diameters on the disc, a little closer at sides, all punctures with moderately long suberect hair. Scutellum impunctate. Elytra ecostate other than the wellmarked and narrow sutural costa, disc rugosely punctate, the punctures separated by once to twice their diameters, with very sparse, scattered, suberect short hairs. Pygidium convex, polished, rugosely punctate, the punctures very fine and not dense, with sparse short, erect hair. Abdomen faintly convex and highly polished, very sparsely, finely punctate and glabrous at middle; 5th sternite declivous behind, very sparsely and irregularly punctate at middle, in fact much

less densely so than at sides; 6th sternite three-fifths length of 5th, basal margin faintly thickened, disc hardly flattened, rugosely granulate at middle and finely, setigerously punctate at sides. First segment hind tarsus distinctly longer than second; spurs free. Claw short and widely cleft, the basal tooth reflexed and the apex obliquely truncate, the cleft forming about a 45 degree angle; both teeth are of approximate length, the lower a little broader at base; claw base hardly dilated. Genitalia bilaterally symmetrical, apices of lateral lobes free, though touching; in lateral view the lateral lobes are quite broad and truncate at their apex. Length 14 mm.

The unique male holotype in the Saylor Collection is from «Coronado, Costa Rica, 1400-1600 m, July 1924, am Gebüsch.

The species does not appear to be very close to any described form though it belongs in the *cribricollis* Blanchard group.

*Phyllophaga (Phyllophaga) favosa*, n. sp.

Male. — Robust-oval; color rufotestaceous and shining, elytra testaceous, the head and thorax rufous; above completely haired. Clypeus almost semicircular, the apex slightly subtruncate and somewhat reflexed; disc densely punctate, with very short, erect pile. Front very densely, contiguously, and coarsely punctured, with short hairs. Antennae 10-segmented, rufous, club lighter, ovate, equal to segments 3-7 combined. Thorax slightly dilated at sides, ciliate, slightly crenulate, and straight each side of dilation; front angles rectangular though hardly produced, hind angles distinct and obtuse; disc completely punctate, with fine punctures separated by twice or more their diameters and rather regularly placed, with intermixed, very-short hairs. Scutellum punctate. Elytra punctured as thorax and with short, almost minute hairs and some longer hairs near base; disc ecostate except for sutural. Pygidium slightly convex, polished; disc punctured like thorax but the punctures here separated by only once their diameters and with very short erect hair; apex narrowed, subtruncate, slightly reflexed. Abdomen very convex, either evenly rounded or faintly and longitudinally impressed; disc very finely, densely punctate, with minute erect hair; 5th sternite faintly declivous apically, the middle with a dense patch of transverse granules; 6th sternite slightly shorter

than 5th, transversely flattened, the basal margin somewhat thickened and the apical margin ciliate and carinate, both margins narrowly interrupted at middle; disc of 6th very finely and sparsely punctate and with short erect hairs. First segment hind tarsus distinctly shorter than second; spurs free. Mentum convex. Claw moderately long, the basal tooth median in position, and of same proportions as, though faintly longer than, the apical tooth; claw base very obtusely dilated and well separated from basal tooth by a broad notch. Genitalia bilaterally symmetrical, of complete ring-shaped type; in en-face view the apex of each lateral lobe is a sharp, acute tooth and the median underpiece is divided into two short, triangular teeth.

Female. — Antennal club a very little shorter. Pygidium slightly more convex. Abdomen with 5th sternite more densely punctate at middle and with short hairs, the 6th sternite faintly convex and more densely punctate. Otherwise as in male. Length 17-18.

The holotype male and allotype female in the Saylor Collection are from «Hamburgfarm, Reventazon, Costa Rica, Ebene Limon, F. Nevermann Collection, April 8, 1930 and February 4, 1932». Two male paratypes also from Hamburgfarm were taken April 3.

The species is near the Mexican *P. pallidicornis* Moser but the abdomen is not sulcate and the antennal club and dorsal puncturation are different.

*Phyllophaga (Phyllophaga) guapilesea*, n. sp.

Male. — Oblong-oval; color testaceocastaneous and shining, the head and thorax rufous; above hairy, the elytra minutely so. Clypeus semirounded, apex slightly reflexed, subtruncate and not sinuate; disc somewhat densely punctate. Front somewhat coarsely, moderately densely punctate, with short erect pile. Antenna 10-segmented, rufous; club long and nearly one-fourth longer than funicle. Thorax somewhat dilated, sides straight and ciliate, somewhat crenate and subparallel behind dilation; front angles rectangular but not produced, hind angles distinct but obtuse, disc with fine punctures separated by two to four times their diameters on disc and closer at sides, with a very irregularly-shaped median smooth space, the punctures with short hairs and some few longer hairs intermixed. Scutellum punctate. Elytra subrugosely

punctate, the punctures separated by one and one-half to two times their diameters, with minute hairs and some few short ones near base. Pygidium slightly convex and polished; disc finely closely and entirely punctate with very short erect hairs of one length only; apex very narrowly rounded, reflexed and ciliate. Abdomen polished, middle flattened; sternites 2-4 with sparse transverse granules at middle; 5th sternite flat, with a very dense patch of the transverse granules; 6th flattened and a little shorter than 5th, the apex carinate, ciliate and narrowly interrupted at middle, the disc with several small granules at middle base and very sparse and fine punctures bearing short erect hairs as rest of disc. First segment hind tarsus much shorter than second; spurs free. Claw with the basal tooth median in position, and a little shorter and more triangular than apical tooth; claw base very obtusely dilated. Genitalia bilaterally symmetrical, of complete ring-shaped type; in enface view each lateral lobe is very narrow, quite long, strongly acuminate, and closely approaching each other apically, the median underpiece slightly indicated as being divided into two short teeth; in lateral view the lateral lobes are very strongly and broadly prolonged and the median underpiece is very small in comparison. Length 17 mm.

The unique male Holotype in the Saylor Collection is from «Guapiles, Sta. Clara, Costa Rica, 250-300 m, F. Nevermann Collection, March 25, 1935, at light.»

The species is related in external facies to *favosa* Saylor but the genitalia are very different and the antennal club is of an entirely different size in the two species.

### **Metamorfosis de *Hypercallia bourquiniella* Koehler, 1939 (Lep. Oecophoridae)**

por Ferd. Bourquin, Buenos Aires

(Con 4 figuras y 1 lámina)

Cette espèce est curieuse, dans tous ses états. L'oeuf fusiforme imite un poisson sans queue, avec les écailles bien dessinées. Ils sont pondus les uns sur les autres, sur le bord extérieur de la feuille et dans son même plan, augmentant ainsi son diamètre. La chenille mesure 18,50 mm., la tête est marbrée de jaune et de noir, le corps vert pâle, légèrement rayé longitudinalement de lignes noirâtres; on observe aussi des dessins noirâtres en forme de «S» très ouvert sur la face subdorsale. La chenille se nourrit de *Solanum*

*pseudocapsicum*. Elle enroule le bord de la feuille pour s'en faire une cachette et sort de nuit pour se nourrir. Elle se transforma en chrysalide après une vie larvaire de quarente sept jours. Par sa forme elle imite une pointe de flèche en pierre, de structure très en relief. Le papillon a des palpes particulièrement développés, les ailes antérieures sont brunes, curieusement festonnées et les ailes postérieures sont grisâtres.

### Biología

En 1933 cacé una mariposa de aspecto singular. Buscada año tras año, fué solamente en los primeros días de marzo de 1939, que mi esposa capturó un ejemplar hembra en la Quinta «La Tacuarita», Islas del Delta del Rio Paraná (República Argentina). Mr. Bainbrigge Fletcher consultado, la declaró especie nueva y el Entomologo Pablo Koehler la determinó como *Hypercallia bourquiniella* Koehler 1939, por cuya gentileza le quedo agradecido.

El 3 de marzo el insecto puso huevos fusiformes, los unos sobre los otros, en el borde de una hoja y en su mismo plano; forman festones irregulares que agrandan así el ancho de la hoja. Un manchón tiene 12 mm de largo por 2 mm de alto, otros de 3,90 mm por 2 mm; 3,80 mm por 1,60 mm; 3 mm por 0,90 mm, y el final del desove formado por grupos de 6,3 y 1 huevo dispuestos en fila. Se cuentan difícilmente; su número llega, más o menos, a unos setenta y cinco huevos. Oservé también este extraño desove adherido al costado de una tira de papel puesta exprofeso en el vaso que contenía la mariposa viva.

### Etología de la Oruga

Nacieron después de nueve días de vida embrional a una temperatura media de 15° C, no comieron la cáscara del huevo. Sobre unas cincuenta orugas, dos se colocaron en el parénquima de la hoja de *Solanum pseudocapsicum* L. y comieron; otras antes de alimentarse eligieron una hoja joven, se colocaron en su ápice a lo largo de la nervadura central y se escondieron en parte, debajo de unos pilares separados y equidistantes los unos de los otros, formados por hilos de seda rectos y paralelos. Al llegar a unos 5 mm de largo su escondrijo está formado por grupos de hilos de seda que se cruzan en forma de X. Cada hilo adherido a la hoja, no toca el siguiente, pero se unen en la mitad de su largo. Estos grupos de hilos forman así dos pirámides de

base ancha unidas por sus vértices. Teje así separadas y a distancias equidistantes varios grupos y después de este trabajo se coloca debajo y queda inmóvil. Al secarse los hilos de seda, se dobla la hoja y la oruga queda bien protegida. Más crecida aún, arrolla un borde de la hoja en forma de tubo, que le sirve de habitáculo. Conserva su escondrijo aunque se marchite o se pudra la hoja, pues sale de noche en procura de alimento fresco. No contamos el número de ecdisis, por temor de perder la cría, pues fracasamos con varias biología de microlepidópteros en años anteriores, por haber deshecho a menudo el habitáculo sedoso de la oruga para observarla. Se ve que el tejar nuevamente su escondite debilita demasiado a la larva, especialmente en sus primeros estadios.



Fig. 1. *Hypercallia bourquiniella* Koehler; mapa de los pelos de la oruga.

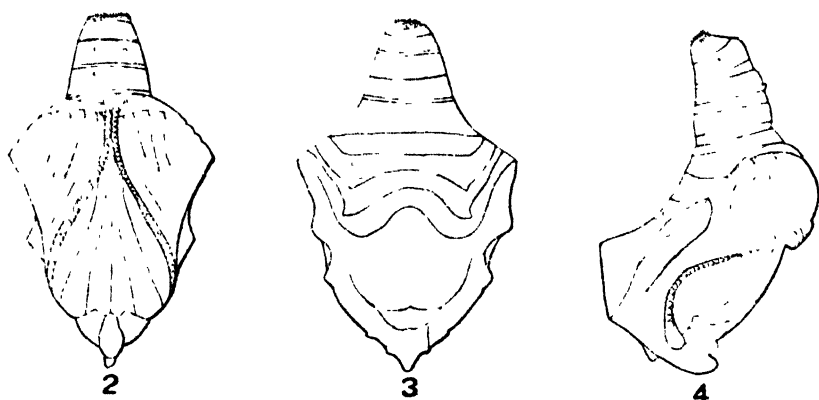


Fig. 2. *Hypercallia bourquiniella* Koehler, crisálida, vista ventral. -- Fig. 3. *Idem*, vista dorsal. -- Fig. 4. *Idem*, vista lateral.

### Etología de la crisálida

Sobre un total aproximado de setenta y cinco huevos, conseguimos solamente cuatro adultos. Después de cuarenta y siete días de vida larval y a una temperatura media de 19° C, se transformó en crisálida, en forma de losange imitando una

punta de flecha de piedra. El color inicial es pardinegro; pero se modifica tomando matices bronceados con reflejos metálicos «mordoré».

### Morfología de la oruga

Llegada a desarrollo máximo tiene 18,50 mm de largo. El ancho del segmento primero es de 1,75 mm y 2,40 mm el del segundo. La cabeza tiene 1,45 mm de diámetro, el color está formado por franjas y manchas de formas irregulares de matiz amarillo pálido y negro. Los ocelos son negros colocados dentro de una mancha negra. La frente es negra y en el centro tiene una mancha amarilla, más o menos, circular. En el interior de la misma y cerca de su base se observa un punto negro. La banda adfrontal es amarilla, la sutura metópica de los epicráneos idem. El clipeo es blancuzco, el labro negro con el borde externocentral amarillo. El artejo basal de las antenas es cónico, blancuzco, el segundo artejo negro, el tercero claro nace del borde interior del mismo y termina con una cerda corta, blanca. Del borde exterior del segmento segundo, sale un largo pelo blanco. Se observan cerdas blancas en la parte ocelar, una en el ángulo de la base de la frente, otras en el clipeo y el labrum. El segmento primero se estrangula en su parte posterior, lleva una placa quitinosa que abarca toda la parte dorsal y subdorsal, con los mismos dibujos y colores que la cabeza. El segmento segundo se ensancha bruscamente de 1,50 mm para el segmento 1, a 2,10 mm por el segundo, su matiz y aspecto es muy parecido al anterior. El color general del resto del cuerpo es verdoso amarillento claro, con unas manchas alargadas, grisáceas en su faz dorsal. Se observan también verruguitas circulares negras, de las cuales sale una cerda recta y blanca. Están dispuestas según el fotodibujo (Fig. 1). En la parte subdorsal de los segmentos 4 a 10 se dibujan líneas negras en forma de «S» muy abierta que empiezan (en la oruga viva) desde la base posterior de la verruga negra posterosubdorsal del segmento 3; cruza completamente el segmento 4 y termina en la base anterior de la verruga negra supraestigmática del segmento 5. Subsiste este dibujo en los segmentos 5 a 10. En los segmentos 11 y 12 la línea negra toma forma de herradura abierta hacia la parte anterior de la larva. La línea subspiracular es verde turquesa claro, como también la faz ventral que tiene una ver-



*Hypercallia bourguiniella* Koehler  
Fig. 1. Huevos. — Fig. 2. Oruga preparándose para crisalidar. — Fig. 3. Imago macho.  
— Fig. 4. Imago hembra. — Fig. 5. Crisálida, vista dorsal. — Fig. 6. *Solanum pseudocapsa* L. — Fig. 7. Pelecho de la oruga. (Fotos Ferd. Bourquin.)





ruguita negra en cada segmento, del 2 al 11. El color de la parte ventral de los segmentos 1 y 2 es grisáceo uniforme; en el segmento 3 el matiz es turquesa hasta el estigma, después es negruzco oscuro como ya ha sido descrito. Las patas torácicas son grisáceas con anillos negros en la base de los artejos. Los pseudo y pigopodios son turquesa claro con ventosas circulares claras.

### El Huevo

3.III.39. 15° C. — Es fusiforme, de 1,10 mm de largo por 0,25 mm de ancho, de color amarillo pálido con tres rayas transversales amarillo rojizo en la parte dorsal, (llamando ventral la adherida a la hoja ó a outro huevo), la una en la mitad y las otras dos al cuarto y tres cuartos de su largo. La cáscara tiene dibujos que imitan las escamas de un pez.

### Morfología de los estadios larvales

Primer estadio (12.III.39; 13° C). — Al nacer tiene 1,15 mm de largo por 0,20 mm de ancho, la cabeza llevada horizontalmente es negra con unas cerdas blancas, rectas. Las antenas son blancuzcas, el labro ámbar oscuro. El primer segmento lleva una fuerte placa quitinizada negro-brillante, que abarca toda su faz dorsal. En su parte subdorsal se observan dos diminutas verrugas negras, la anterior con una cerda horizontal ligeramente curvada hacia abajo. El cuerpo de la larva es amarillo manteca pálido, con cerdas blancas, rectas. Cada segmento lleva en la parte estigmática una cerda más larga, un poco curvada hacia abajo. El segmento 12 tiene, además, otra cerda en el mismo plano dirigida de costado a 45° en lugar de perpendicular a la línea centrodorsal.

7.V.39. 18° C. — La oruga tiene 10,10 mm de largo, por 1,25 mm de ancho. La cabeza es de color negro azabache con unas cerdas blancas. El segmento primero lleva una placa quitinosa negro-brillante con unas cerdas blancas y el segmento 2.º es grisáceo oscuro con dos verruguitas negras de las cuales sale una cerda blanca. Los demás segmentos son verde pálido, estriados longitudinalmente de negruzco pálido; más oscuro en los segmentos 11 y 12. Estas líneas dan a la larva un matiz verdoso grisáceo, menos la parte dorsal de los segmentos 11 y 12 que es negruzco. Cada

segmento tiene tres verruguitas negras que se reducen a un punto, dos de ellas son anterodorsal y anterosubdorsal, la tercera posterosupraestigmática. Las patas torácicas son negro-brillante, los pseudo y pigopodios blancuzcos.

12.IV.39. 20° C. — La larva tiene 15,30 mm de largo, por 1,90 mm de ancho, la cabeza es negra, con dibujos amarillo-pálido. No observamos cambios en la oruga.

18.IV.39. 20° C. — Llegada a su desarrollo máximo tiene 18,50 mm de largo, por 2,40 mm de ancho; la cabeza es marmolada de amarillento claro, estriado de negro como ya ha sido descrito.

### La Crisálida

19.IV.39. 21° C. — Tiene 5,90 mm de largo por 3,40 mm de ancho medido sobre las alas; el abdomen mide 1,50 mm de diámetro y las alas bajan hasta 4,40 mm del vértice de la cabeza. El color es pardinegro; la parte en forma de losange imita una punta de flecha de piedra. Por su irregularidad podría hacer suponer que la mariposa pertenece a la familia Nymphalidae. El vértice de la crisálida termina en punta, las alas están marcadas en relieve y forman la parte más ancha de la crisálida. En la faz dorsal se nota bien marcado de negro, los lugares de seis estigmas. Vista de costado la zona alar está cruzada transversalmente por seis líneas blancas, la tercera, a contar desde la parte anterior, toma todo el ancho del ala. El cremáster, chato está lleno de ganchitos con los cuales la crisálida está fijada a la rama.

### El adulto

2.V.39. 21° C. — La mariposa nació a los trece días de haberse transformado en crisálida, la que permaneció a una temperatura media de 20° m.

### Bibliografía

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**A Century of new American Thysanoptera. III.**

by J. Douglas Hood, Cornell University, Ithaca, N. Y.

(With 5 figures)

Genus *Hoplandrothrips* Hood, 1912

This genus, like many others in the tubuliferous suborder, is a difficult one taxonomically, especially if only short series are available for study. Most of the difficulty is the result of extensive variation in the adults, and this, in turn, is a reflection of the differing environmental conditions under which the nymphs of every species feed and grow and develop. Those nymphs which have been exposed to optimum conditions and have thus been able to store large quantities of food, develop during the pupal stadium into large adults. If they are males, these larger individuals will have stout fore legs, armed with two teeth on the femur and one tooth on the tibia. Small males, produced under less favorable conditions, will have slender, unarmed fore legs. And between these extremes of development there inevitably occurs a series of completely intergrading forms. Furthermore, in a few species, these marked heterogonic effects make their appearance in the opposite sex as well, where large females have the fore femora and tibiae armed like those of large males, while small females of these species have unarmed fore legs.

Equally interesting, and correlated with variation in the form and structure of the fore legs, is the marked variation in color exhibited by the males of certain species. This is especially conspicuous in *H. microps*, where the expansion of the yellow areas on the antennae and legs of large males produces an appearance very different from that of the modestly-hued smaller ones.

Linked with the variations which have been mentioned are several other structural ones involving, for example, the proportionate length and width of the head, of the prothorax, and of the antennal segments; the length and character of certain setae, the degree of production of the mesothoracic angles; and, in one species, the development of a finger-like metanotal process which, in heterogonic maxima individuals, may extend posteriorly as far as the base of the abdomen.

Until one is thoroughly familiar with the profound structural and colorational differences which can result from varying environmental factors — until large numbers of individuals of

several species have been studied in the field and in the laboratory — specific identification in this genus and many others is difficult in the extreme, if not actually impossible. In fact, it is conceivable that the beginner might «cut across the grain» by associating together as one species either of the heterogonic extremes of several different ones, simply because they often look more alike than the opposite extremes of the same species.

Lack of time and space has prevented the description of the various completely intergrading forms found in several of the new species made known below, but in each case where long series were available the holotype and allotype were selected from among the largest individuals. In using the descriptions, then, for the identification of specimens, one should, if possible, select those individuals whose measurements correspond most closely with those of the types and, afterwards, on the basis of knowledge gained in part in the field, associate with them the smaller specimens of the same species.

57 *Hoplandrothrips cubicola*, sp. nov.

**Female** (macropterous). — Length about 2.1 mm. (fully distended, 2.7 mm.). Color brown, with bright red internal pigmentation, the abdomen of the unique (and perhaps teneral) type decidedly paler in the seven basal segments, the third to seventh each with a median transverse brown dash just behind the antecostal line; all coxae and femora concolorous with body, all tibiae and tarsi lemon-yellow; fore wings nearly clear, only slightly darkened in scale and at base; antennae with segments I, II, and VI-VIII dark blackish brown, II only slightly paler in median apical portion, III yellow, infusate in about apical half, especially along inner surface, IV and V nearly as dark as VI-VIII, but with their pedicels yellow.

**Head** about 1.3 times as long as greatest width, which is across cheeks; cheeks narrowed abruptly to eyes and converging to basal collar, otherwise nearly parallel, the least subbasal width only 0.9 the greatest width; dorsal and lateral surfaces (except for a smooth median area) very faintly subreticulate, and thus with only a faint serration along the cheeks; vertex lightly reticulate, subconical and overhanging, bearing the median ocellus at its extremity; postocular setae pale brownish, with dilated tips which are slightly divided, their length about 73 microns, interval 152, distance from eyes about 23; other cephalic setae small, brown, pointed, those on dorso-

lateral surfaces arising from low tubercles, three lateral pairs more conspicuous than the others. Eyes normal to the genus, rounded, the width across them 0.9 the greatest width across cheeks, their greatest dorsal length (74 microns) scarcely 0.3 that of head. Ocelli normal, 20-21 microns in diameter, the median one with its posterior margin on a line with anterior margin of eyes, the posterior pair 27 microns apart and 16 microns from median ocellus. Antennae thoroughly typical, except that segment VIII is sharply narrowed at base and thus not at all broadly united to VII; sense-cones moderately stout, nearly pointed, that on inner surface of III about 27 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 ( $1\frac{1}{2}$ ), VI 1 ( $1\frac{1}{2}$ ), VII 1 dorsally. Mouth-cone rounded at tip, its length beyond posterior dorsal margin of head about 120 microns.

Prothorax with median line of pronotum about two-thirds the length of head and contained 2.26 times in the transcoxal breadth, its dorsal surface wholly free of sculpture save for a few slight anastomosing lines laterally, anteriorly, and posteriorly: all major setae present, brownish yellow, with broadly dilated and somewhat divided tips, the antero-marginals 47 microns, antero-angulars 61, midlaterals 58, epimerals 70, postero-marginals 85, coxals 51. Pterothorax equal in width to prothorax, broadest across anterior angles; metanotum faintly subreticulate in narrowed posterior portion and at sides, only, many of the reticles elongate, remainder of sclerite without sculpture. Legs normal, fore femora not toothed, fore tarsi with a small tooth near middle. Wings normal, fore pair 0.868 mm. long, about 76 microns wide at basal third, 58 microns at the narrowest point just beyond middle, and 86 microns subapically, posterior margin with 8-9 accessory setae, the subbasal setae brownish yellow and dilated apically, 60-63 microns long.

Abdomen only slightly broader than pterothorax, the sculpture of its dorsal surface weak and confined largely to sides of segments, most distinct in median tergite of segment I, which is subreticulate; tube about 0.68 the length of head, stouter than usual, only 1.8 times as long as its greatest subbasal width (which is across the basal collar), this width 2.2 times that at apex, its sides straight; terminal setae pointed, dark brown, their length (182 microns) greater than that of tube; lateral abdominal setae yellowish or brownish, all with pale dilated tips except the small outer lower pair on II-VII,

seta II on VII, and III on IX, all of which are pointed; setae I and II on IX dull and rounded at tip, rather than dilated or pointed.

Measurements of female (holotype), in mm.: Length about 2.10 (fully distended, 2.68); head, total median length 0.253, width across eyes 0.174, greatest width across cheeks 0.193, least width near base 0.178; prothorax, median length of pronotum 0.167, width (inclusive of coxae) 0.377; mesothorax, width across anterior angles 0.378; abdomen, greatest width (at segment IV) 0.403; tube, length 0.171, greatest sub-basal width 0.094, least apical width 0.043; seta I on IX 0.157, II 0.165, III 0.173.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	47	62	73	70	64	60	52	49
Width (microns):	47	35	43	42	34	27	26	17
Total length of antenna, 0.477 mm.								

CUBA: San Vicente (Pinar del Rio), July 8-9, 1940, Professor J. Chester Bradley, 1 ♀, from grass.

From the other species of the genus in which the legs are similarly colored and the metanotum smooth medially, *cubicola* differs conspicuously in the form of the tube and of the last antennal segment.

### 58. *Hoplandrothrips scutellaris*, sp. nov.

Female (macropterous). — Length about 2.1 mm. (fully distended, 2.6 mm.). Color brown or blackish brown, with bright red internal pigmentation; all coxae and femora concolorous with body, all tibiae and tarsi pale lemon-yellow; fore wings only slightly darkened in scale, distinctly gray in second third, paler and more yellowish in apical third; antennae with segments, I, II, VII, and VIII blackish brown, II only slightly paler apically, III almost wholly yellow, lightly infuscate at extreme apex, IV-VI dark, but with their basal two-fifths, one-third, and one-fifth, respectively, bright yellow.

Head about 1.22 times as long as greatest width, which is across cheeks; cheeks arcuate, narrowed abruptly to eyes and converging to basal collar, the least subbasal width scarcely 0.9 the greatest width; dorsal surface with delicate large reticles which do not quite involve the median line, the reticles on the latero-dorsal and latero-ventral surfaces asperate, the cheeks thus conspicuously serrate; vertex nearly smooth, subconical

and overhanging, bearing the median ocellus at its extremity; postocular setae brown, paler apically, with dilated tips which are slightly divided, their length about 74 microns, interval 162, distance from eyes approximately 20; other cephalic setae small, brown, pointed, those on dorso-lateral surface arising from low tubercles, three or four lateral pairs more conspicuous than the others. Eyes normal to the genus, rounded, the width across them 0.9 the greatest width across cheeks, their greatest dorsal length (94 microns) about one-third that of head. Ocelli normal, 22-25 microns in diameter, the median one with its posterior margin on a line with anterior margin of eyes, the posterior pair 25 microns apart and 24 from median ocellus. Antennae thoroughly typical; segment VIII only slightly narrowed basally and thus rather broadly attached to VII, with a slight subbasal constriction; sense cones moderately stout, nearly pointed, that on inner surface of III about 35 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone narrowed apically but rounded; labrum surpassing labium, its tip about 178 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum about 0.6 the length of head and contained nearly 2.4 times in the transcoxal breadth, its dorsal surface wholly free of sculpture save for a few slight anastomosing lines laterally, anteriorly, and posteriorly; all major setae present, dark brown, with broadly dilated and somewhat divided tips, the antero-marginals 45 microns long, antero-angulars 51, midlaterals 44, epimerals 72, postero-marginals 80, coxals 50. Pterothorax fully as broad as prothorax, widest across anterior angles; metanotum distinctly subrecticulate, without a smooth median area between the two large setae, the reticles at its base and those at apex nearly equilateral, the others elongate. Legs normal, fore femora not toothed, fore tarsi with a stout tooth before middle. Wings normal, fore pair about 1.0 mm. long, about 100 microns wide at basal third, 73 microns at the narrowest point just beyond middle, and 93 microns subapically, posterior margin with 11 or 12 accessory setae, the subbasal setae pale yellow, dilated apically, and respectively about 64, 84, and 91 microns long.

Abdomen distinctly broader than pterothorax, the sculpture of its dorsal surface weak and confined largely to sides of segments, most distinct in median tergite of segment I, which



is subreticulate; tube about twothirds the length of head, about 2.3 times as long as its greatest subbasal width (which is across the basal collar), this width scarcely twice that of apex, its sides slightly concave near base; terminal setae pointed, dark brown, their length (196 microns) greater than that of tube; lateral abdominal setae pale yellowish or brownish (thus much paler than those of head and prothorax), all with pale dilated tips except the lowermost pair on V-IX, which are pointed; setae I and II on IX dilated at apex.

Measurements of female (holotype), in mm.: Length about 2.13 (fully distended, 2.57); head, total median length 0.277, width across eyes 0.206, greatest width across cheeks 0.227, least width near base 0.193, width across basal collar 0.197; prothorax, median length of pronotum 0.162, width (inclusive of coxae) 0.385; mesothorax, width across anterior angles 0.391; abdomen, greatest width (at segment IV) 0.462; tube, length 0.182, greatest subbasal width 0.079, least apical width 0.042; seta I on IX 0.107, II 0.118, III 0.118.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	47	63	90	85	80	64	55	43
Width (microns).	46	37	43	42	36	30	26	15
Total length of antenna, 0.527 mm.								

Male (macropterous). — Very similar to female in color and structure, differing merely in the usual ways.

Measurements of male (allotype), in mm.: Length about 2.09 (fully distended, 2.51); head, total length 0.273, width across eyes 0.200, least width just behind eyes 0.190, greatest width across cheeks 0.209, least width near base 0.176; eyes, dorsal length 0.090; median ocellus, diameter 0.029; posterior ocelli, diameter 0.023, interval 0.024, distance from median ocellus 0.025; postocular setae, length 0.087, interval 0.157, distance from eyes 0.033; mouth-cone, length beyond posterior dorsal margin of head 0.175; prothorax, median length of pronotum 0.182, greatest width (inclusive of coxae) 0.372; antero-marginal setae, length 0.025, antero-angulals 0.100, mid-laterals 0.070, epimerals 0.067, postero-marginals 0.097, coxals 0.056; pterothorax, width across anterior angles 0.398; fore wings, length 1.06, width near base 0.094, width at middle 0.067, greatest subapical width 0.080, lengths of subbasal setae 0.070, 0.083, and 0.099, respectively; abdomen, greatest width (at segment II) 0.370; tube (segment X, only), length 0.168,

greatest subbasal width 0.075, least apical width 0.039; seta I on segment IX 0.110, II 0.051, III 0.140; terminal setae 0.182.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	46	63	93	85	76	65	56	47
Width (microns):	45	35	42	40	34	29	24	17
Total length of antenna, 0.531 mm.								

NEW YORK: Slaterville, May 27, 1938, J. D. H., 3 ♀♀ and 1 ♂ (including holotype and allotype), from dead maple leaves and dead apple branches; Cananpaigna Lake, May 29-30, 1934, J. D. H., 1 ♂, from Virginia creeper; Ellis, June 7, 1938, J. D. H., 1 ♀ from dead cherry branches; Ithaca, May 25, 1938, J. D. H., 1 ♀ from dead willow branches; Labrador Hollow (Cortland Co., near Tully), June 4, 1938, Professor J. Chester Bradley, 45 ♀♀ and 4 ♂♂, from dead apple branches; Macedon, May 18, 1924, J. D. H., reared from nymph taken April 21 under bark on dead maple sapling; Oswegatchie, August 17, 1932, J. D. H., 1 ♀ from dying sapling of *Populus tremuloides*.

CONNECTICUT: Storrs, September 10, 1936, J. D. H., 1 ♀, sweeping.

NEW JERSEY: Norma, June 19, 1938, Professor J. Chester Bradley, 1 ♀, from dead branches.

From the genotype, which it closely resembles, this conspicuously colored species differs in having the head less slender, the metanotum reticulate in the whole basal area, and the second pair of setae on the ninth abdominal segment dilated apically in the female.

### *Hoplandrothrips pergandei* (Hinds)

Female (macropterous). — Length about 2.4 mm. (fully distended, 3.2 mm.). Color brown or blackish brown, with bright red internal pigmentation; legs blackish brown, with the tarsi paler; fore wings slightly darkened in scale and with a median gray streak in the narrowed portion; antennae with segments I, II, VII, and VIII blackish brown, II only slightly paler medially, III-VI paler than the others, largely brown, with yellow bases, III and IV dappled with yellow, the former yellow in basal third and along outer surface, IV pale in about basal two-fifths and again at apex, V pale in basal third, VI in basal fourth.

Head about 1.3 times as long as greatest width, which is across cheeks; cheeks arcuate, narrowed abruptly to eyes and

converging to basal collar, the least subbasal width little more than 0.8 the greatest width; dorsal surface subreticulate except for a small area between posterior ocelli and medially between posterior half of eyes, the reticles on the latero-dorsal and latero-ventral surfaces asperate, the cheeks thus conspicuously serrate; vertex subreticulate, subconical and overhanging, bearing the median ocellus at its extremity; postocular setae brown, paler apically, with rather broadly dilated tips which are slightly divided, their length usually 70-84 microns, interval about 182, distance from eyes approximately 25; other cephalic setae small, brown, pointed, those on dorso-lateral surface arising from low tubercles, three or four lateral pairs more conspicuous than the others. Eyes normal to the genus, rounded, the width across them 0.9 the greatest width across cheeks, their greatest dorsal length about one-third that of head, in one caustic-treated specimen measuring as follows in microns: dorsal length 109, dorsal width 70, dorsal interval 80, ventral length 88, ventral width 60, ventral interval 101. Ocelli normal, 22-24 microns in diameter, the median one with its posterior margin on a line with anterior margin of eyes, the posterior pair 30 microns apart and 35 from median ocellus. Antennae thoroughly typical, except that segment III is nearly straight on inner surface and somewhat swollen on outer, with its pedicel not bent outward at base; segment VIII scarcely narrowed basally and thus rather broadly attached to VII, with a slight subbasal constriction; sense-cones moderately stout, rounded at tip, that on inner surface of III about 28 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone narrowed apically but rounded; labrum surpassing labium, its tip about 168 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum about 0.55 the length of head and contained about 2.25 times in the trans-coxal breadth, its dorsal surface lightly sculptured at sides and posteriorly; all major setae present, dark brown, with broadly dilated and divided tips, the antero-marginals (of one large specimen with head 330 microns long) about 54 microns, antero-angulars 60, midlaterals 53, epimerals 89, postero-marginals 100, coxals 54. Pterothorax fully as broad as prothorax widest across anterior angles; metanotum distinctly subreticulate, without a smooth median area between the two large

setae, the reticles at its base and those at apex nearly equilateral, the others elongate. Legs normal, fore femora not toothed, fore tarsi with a stout tooth before middle. Wings normal, fore pair about 1.1 mm. long, about 97 microns wide at basal third, 70 microns at the narrowest point just beyond middle, and 86 microns subapically, posterior margin with 10 or 11 accessory setae, the subbasal setae pale yellow, dilated apically, and respectively about 69, 89, and 85 microns long.

Abdomen distinctly broader than pterothorax, the sculpture of its dorsal surface weak and confined largely to sides of segments, most distinct in median tergite of segment I, which is subreticulate; tube about 0.6 the length of head, about 2.3 times as long as its greatest subbasal width (which is across the basal collar), this width scarcely twice that of apex, its sides slightly concave near base; terminal setae pointed, dark brown, their length (226 microns) much greater than that of tube; lateral abdominal setae pale yellowish (thus much paler than those of head and prothorax), all with pale dilated tips except the lowermost pair on VI-IX, which are pointed; setae I and II on IX dilated at apex.

Measurements of female, in mm.: Length about 2.35 (nearly fully distended, 2.93); head, total median length 0.315; width across eyes 0.216, greatest width across cheeks 0.241, least width near base 0.199, width across basal collar 0.203; prothorax, median length of pronotum 0.185, width (inclusive of coxae) 0.416; mesothorax, width across anterior angles 0.435; abdomen, greatest width (at segment III) 0.459; tube (segment X, only), length 0.189, greatest subbasal width 0.083, least apical width 0.043; seta I on IX 0.130, II 0.143, III 0.150.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	50	67	84	89	77	69	61	37
Width (microns):	47	38	46	42	36	30	26	14
Total length of antenna, 0.534 mm.								

Male (macropterous). — Smaller and more slender than female, but otherwise very similar to it in color and structure.

Measurements of male, in mm.: Length about 2.25 (nearly fully distended, 2.67); head, total median length 0.312, width across eyes 0.199, greatest width across cheeks 0.213, least width near base 0.175, width across basal collar 0.178; median ocellus, diameter 0.021; posterior ocelli, diameter 0.024; postocular setae, length 0.084, interval 0.166; mouth-cone, length beyond posterior dorsal margin of head 0.133; prothorax, median

length of pronotum 0.185, greatest width (inclusive of coxae) 0.382, antero-marginal setae, length 0.024, antero-angulars 0.103, midlaterals 0.064, epimerals 0.048, postero-marginals 0.108, coxals 0.050; pterothorax, width across anterior angles 0.414; fore wings, length 1.19, width near base 0.093, width at middle 0.067, greatest subapical width 0.080; lengths of subbasal setae 0.074, 0.093, and 0.064, respectively; abdomen, greatest width (at segment II) 0.357; tube (segment X, only), length 0.164, greatest subbasal width 0.079, least apical width 0.043; seta I on segment IX 0.094, II 0.063, III 0.173; terminal setae 0.252.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	49	59	77	86	72	63	57	37
Width (microns):	44	36	40	39	33	29	25	13
Total length of antenna, 0.500 mm.								

NEW YORK: St. Lawrence Co. (near Wanakena), August 29, 1939, J. D. H., 19 ♀♀ and 10 ♂♂, under bark on dead alder; Benson Mines, August 31, 1939, J. D. H., 1 ♀, from grasses and sedges; Labrador Hollow (Cortland Co., near Tully), June 4, 1938, Professor J. Chester Bradley, 1 ♂, from dead apple branches; Oswegatchie, August 17, 21, September 7, 8, 1932, August 17, 18, 19, 21, 25, 1934, 22 ♀♀ and 15 ♂♂, from dead branches of yellow birch, maple, and *Vaccinium corymbosum*.

ILLINOIS: Riverside, July 14, 1909, J. D. H., 15 ♀♀ and 5 ♂♂, under dead bark on dry willow stump.

This species resembles *raptor*, described by David L. Crawford from Mexico, which, however, is a smaller, differently proportioned, and more lightly sculptured species, with a shorter tube and with the last antennal segment less slender. *H. pergandei* appears to replace *raptor* in the north.

The purpose of including this species among the descriptions of several new ones in the genus is to call attention, in what seems to be the best possible place, to a serious error in Hinds' original description, an error which until now has prevented the recognition of this common form as *pergandei*. Hinds states that the setae on the ninth abdominal segment and on the tube are acute. Those at the tip of the tube are of course acute, as he says, but the second and third pairs on segment nine are dilated at their tips. His unique type was borrowed from the Massachusetts State College, through Professor C. P. Alexander, and though it is either faded or somewhat teneral (almost certainly the latter) it agrees almost perfectly in structure with many of the specimens in my long series, and in color, as well, with the teneral Illinois specimens. The abdomen of the type is somewhat

contracted and the wings not spread, and hence the setae on the last few abdominal segments are overlain by the hairs of the wings and difficult to see. However, careful inspection shows that the upper two pairs of setae on the ninth segment are rather broadly expanded apically, as has been said.

59. *Hoplandrothrips symmetricus*, sp. nov.

Female (macropterous). — Length about 2.1 mm (nearly fully distended, 2.5 mm.). Color brown or blackish brown, with bright red internal pigmentation; legs about concolorous with body, all tarsi brownish yellow, both ends of all tibiae paler than their middle portions; fore wings (not properly developed in the unique type) largely grayish brown; antennae with segments I and II blackish brown and concolorous with head, I slightly paler across base, II paler and more yellowish apically and medially, III yellow in basal half and irregularly shaded with brown in apical half, more darkly on outer surface, IV much darker than III, brownish yellow in basal half (the pedicel darker), brown in apical half or more, darkest subapically, V brownish yellow in about basal two-fifths, its apical portion and remainder of antennae dark blackish brown.

Head about 1.23 times as long as greatest width, which is across cheeks; cheeks rounded, narrowed abruptly to eyes and converging to near basal collar, the least subapical width scarcely 0.85 the greatest width and nearly 0.96 the width across eyes; dorsal surface almost free of sculpture; latero-ventral surface asperate, the cheeks rather strongly serrate throughout; vertex rectangularly conical, slightly produced and somewhat overhanging, bearing the median ocellus at its extremity; postocular setae light brown, with colorless dilated tips, their length about 80 microns, interval 153, distance from eyes 24; other cephalic setae small, brown, pointed, about three lateral pairs arising from tubercles. Eyes normal to the genus, rounded, the width across them about 0.9 the greatest width across cheeks, their greatest dorsal length (78 microns) about 0.3 that of head, their dorsal width about 59 microns, dorsal interval approximately 68. Ocelli normal, 19-21 microns in diameter, the median one with its posterior margin on a line with anterior margin of eyes, the posterior pair not more than 25 microns apart and about 23 from median ocellus. Antennae typical, except that segment III is nearly symmetrical, straight on inner surface, with the base of its pedicel

not inclined outward, and segment VIII is only slightly narrowed basally and thus rather broadly attached to VII, with a slight subbasal constriction; sense-cones moderately stout, nearly finger-shaped, that on inner surface of III about 33 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone narrowed apically but with labium rounded; labrum surpassing labium, its tip about 174 microns beyond posterior dorsal margin of head.

Prothorax, with median dorsal line of pronotum distinctly more than half the length of head and contained about 2.4 times in the transcoxal breadth, its dorsal surface smooth, except for a few faint striae along posterior margin; all major setae present, brown, with broadly dilated tips, the antero-marginals 29 microns long, antero-angulars 64, midlaterals 54, epimerals 91, postero-marginals 113, coxals 46. Pterothorax broader than prothorax, widest across anterior angles; meta-notum with a large smooth median area in the region of the two large setae, lightly reticulate in the median portion of its posterior half. Legs normal; fore femora and tibiae of the unique type unarmed; fore tarsi with a stout tooth near base. Wings normal, fore pair about 0.09 mm. long; subbasal setae pale yellow, respectively 86, 83, and 77 microns long, all dilated apically.

Abdomen distinctly broader than pterothorax, its sculpture not heavy, most distinct at sides of terga, median tergite of segment I subreticulate; tube (segment X, only) about 0.6 the length of head, twice as long as its greatest subbasal width (which is across the basal collar), this width less than twice that of apex, its sides slightly concave near base; terminal setae pointed, dark brown in about basal two-fifths, nearly colorless apically, their length (256 microns) about 1.7 times that of tube; lateral abdominal setae pale yellowish or brownish (on the whole much paler than those of head and prothorax), all with pale dilated tips except the lowermost pair on IV-VIII and setae II and III on IX, which are pointed; seta I on segment IX dilated at apex.

Measurements of female (holotype), in mm.: Length about 2.07 (nearly fully distended, 2.50); head, total median length 0.260, width across eyes 0.186, greatest width across cheeks 0.211, least width near base 0.178, width across basal collar 0.181; prothorax, median length of pronotum 0.141, width

(inclusive of coxae) 0.342; mesothorax, width across anterior angles 0.363; abdomen, greatest width (at segment III) 0.403; tube (segment X, only), length 0.152, greatest subbasal width 0.076, least subapical width 0.041; seta I on segment IX 0.117, II 0.150, III 0.134.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	55	67	73	63	54	47	35
Width (microns):	43	35	43	43	34	28	26	15
Total length of antenna, 0.431 mm.								

The symmetrical form of the third antennal segment is remindful of the South American and West Indian *affinis*, which, however, has a much longer head, bright yellow fore tibiae, and all of the setae on the ninth abdominal segment pointed.

#### 60. *Hoplandrothrips pallens*, sp. nov.

Female (macropterous). — Length about 1.4 mm. (fully distended, 1.7 mm.). Color of head, prothorax, mesothorax, sides of metathorax, and tube gray-brown, the remainder of body, legs, and first three antennal segments pale grayish yellow; abdominal segments III-VII obscurely shaded with gray laterally and each with a median transverse gray dash just behind the antecostal line, segments VIII and IX somewhat darker, tube pale at base; fore coxae brown, fore femora shaded with brown basally; antennal segments IV-VI largely brown, successively darker, with their basal two-fifths, one-third, and one-sixth, respectively, yellowish, VII and VIII dark brown; fore wings slightly darkened in basal half or more.

Head about 1.25 times as long as greatest width, which is across cheeks; cheeks arcuate, narrowed abruptly to eyes and converging to basal collar, the least subbasal width little more than 0.8 the greatest width; dorsal surface faintly sub-reticulate at extreme base and at sides, the remainder smooth, the reticles not asperate, the cheeks faintly serrate in anterior half, only; vertex subreticulate, only slightly produced, sub-conical, and overhanging, bearing the median ocellus at its extremity; postocular setae pale yellowish brown, with dilated tips, their length 58 microns, interval 115, distance from eyes approximately 17; other cephalic setae small, brown, pointed, those on dorso-lateral surface arising from low tubercles, one or two lateral pairs behind middle of cheeks more conspicuous than the others. Eyes normal to the genus, rounded, the width across them about 0.9 the greatest width across cheeks,



their greatest dorsal length (66 microns) about 0.3 that of head. Ocelli normal, 16-18 microns in diameter, the median one with its posterior margin distinctly behind the line of anterior margin of eyes, the posterior pair 21 microns apart and 20 from median ocellus. Antennae typical, except that segment III is symmetrical and nearly straight on both inner and outer surfaces, and its pedicel is not bent outward at base; segment VIII rather broadly attached to VII, though narrowed basally and with a strong subbasal constriction; sense-cones moderately stout, acutely rounded at tip, that on inner surface of III about 19 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone rather broadly rounded apically; labrum surpassing labium, its tip about 102 microns beyond posterior dorsal margin of head.

Prothorax with median line of promotum one-half the length of head and contained about 2.5 times in the trans-coxal breadth, its dorsal surface smooth excepting for two or three faint striae along posterior margin; all major setae present, pale yellowish brown, with broadly dilated tips, the antero-marginals about 31 microns, antero-angulars 37, midlaterals 22, epimerals 47, postero-marginals 42, coxals 30. Pterothorax distinctly narrower than prothorax across coxae, widest across anterior angles; metanotum lightly polygonally subreticulate throughout. Legs normal, fore femora not toothed, fore tarsi with a stout tooth at base. Wings normal, fore pair about 0.644 mm. long, about 57 microns wide at basal third, 40 microns at the narrowest point just beyond middle, and 51 microns subapically, posterior margin with 6 or 7 accessory setae, the subbasal setae pale yellow, the first two dilated apically, the third pointed, their lengths respectively 30, 33, and 43 microns.

Abdomen distinctly narrower than pterothorax, the sculpture of its dorsal surface very weak and confined largely to the sides of the segments; tube (segment X, only) about 0.45 the length of head, only 1.7 times as long as its greatest subbasal width (which is across the basal collar), this width scarcely twice that of apex, its sides slightly concave near base; terminal setae pointed, dark brown, their length (143 microns) much greater than that of tube; lateral abdominal setae pale yellowish, all with pale dilated tips except the lowermost pair

on II-IX and the lateral pair on VII, which are pointed; setae I and II on IX dilated at apex.

Measurements of female (holotype), in mm.: Length about 1.39 (fully distended, 1.72); head, total median length 0.218, width across eyes 0.152, greatest width across cheeks 0.174, least width near base 0.142, width across basal collar 0.145; prothorax, median length of pronotum 0.109, width (inclusive of coxae) 0.276; mesothorax, width across anterior angles 0.251; abdomen, greatest width (at segment III) 0.228; tube (segment X, only), length 0.098, greatest subbasal width 0.057, least apical width 0.031; seta I on IX 0.075, II 0.067, III 0.083.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	34	47	52	48	44	44	39	27
Width ((microns):	32	27	34	30	26	24	22	14
Total length of antenna, 0.325 mm								

CUBA: Pinar City, Pinar del Rio, July 11, 1940, Professor J. Chester Bradley, 1 ♀, from dead branches.

The small size and the peculiarly colored legs and antennae are thoroughly distinctive characters.

#### 61. *Hoplandrothrips lissonotus*, sp. nov.

Female (macropterous). — Length about 2.4 mm. (fully distended, 3.0 mm.). Color brown or blackish brown, with bright red internal pigmentation; legs blackish brown, with all tarsi and the tips of all tibiae, yellow, the fore tibiae yellowish also at base; fore wings distinctly darkened in a little more than basal half, darkest in scale and in second fourth, almost colorless beyond the narrowed area near middle; antennae with segments I and II blackish brown and about concolorous with head, II paler and more yellowish apically and medially, the remainder of antennae paler, bases of III-VII yellow, III yellow in about basal three-fifths, IV-VI in about basal two-fifths, VII in basal third or fourth.

Head about 1.4 times as long as greatest width, which is across cheeks; cheeks slightly arcuate, narrowed abruptly to eyes and converging to basal collar, the least subbasal width about 0.9 the greatest width; dorsal surface subreticulate except medially, the area between the posterior ocelli and between the eyes smooth, the reticles on the latero-dorsal and latero-ventral surfaces asperate, the cheeks thus conspicuously serrate;

vertex subreticulate, rather sharply conical, and overhanging, bearing the median ocellus at its extremity; postocular setae yellowish brown, paler apically, with rather broadly dilated tips which are slightly divided, their length usually 67-76 microns, interval about 179, distance from eyes approximately 30; other cephalic setae small, brown, pointed, the four or five lateral pairs arising from tubercles which, in larger specimens, are large and prominent. Eyes normal to the genus, rounded, the width across them 0.9 the greatest width across cheeks, their greatest dorsal length about one-third that of head, in one caustic-treated paratype (with head 311 microns long) measuring as follows in microns: dorsal length 98, dorsal width 61, dorsal interval 74. Ocelli normal, 22-23 microns in diameter, the median one with its posterior margin on a line with anterior margin of eyes, the posterior pair about 27 microns apart and 28 from median ocellus. Antennae thoroughly typical; segment III with profile of inner surface distinctly sigmoid and with extreme base of pedicel tipped slightly outward; segment VIII slightly narrowed basally but rather broadly attached to VII, with a slight subbasal constriction; sense-cones moderately stout, rounded at tip, that on inner surface of III about 30 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone narrowed apically but with the labium rounded; labrum surpassing labium, its tip about 189 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum about 0.55 the length of head and contained about 2.3 times in the transcoxal breadth, its dorsal surface lightly sculptured anteriorly, laterally, and posteriorly, as well as in front of the postero-marginal setae; all major setae present, yellowish brown, with broadly dilated, divided, pale tips, the antero-marginals (of holotype) about 53 microns, antero-angulars 63, midlaterals 60, epimerals 89, postero-marginals 90, coxals 44. Pterothorax about equal in width to prothorax, broadest across anterior angles; metanotum with a large smooth median area between the two large setae, distinctly subreticulate at the sides of and behind this area. Legs normal, fore femora not toothed, fore tarsi with a stout tooth before middle. Wings normal, fore pair about 1.1 mm. long, about 100 microns wide at basal third, 65 microns at the narrowest point just beyond middle,

and 87 microns subapically, posterior margin with 10-14 accessory setae, the subbasal setae pale yellowish, dilated apically, and respectively 70, 80, and 103 microns long.

Abdomen distinctly broader than pterothorax, the sculpture of its dorsal surface heavier than usual; median tergite of segment I subreticulate; tube (segment X, only) nearly 0.6 the length of head, about 2.3 times as long as its greatest subbasal width (which is across the basal collar), this width scarcely twice that of apex, its sides slightly concave near base; terminal setae dark brown, pointed, their length (about 196 microns) somewhat greater than that of tube; lateral abdominal setae pale yellowish or brownish (thus paler than those of head and prothorax), all with pale dilated tips except the lowermost pair on VII-IX, which are pointed; setae I and II on IX dilated at apex.

Measurements of female (holotype), in mm.: Length about 2.44 (nearly fully distended, 3.02); head, total median length 0.315, width across eyes 0.203, greatest width across cheeks 0.230, least width near base 0.202, width across basal collar 0.204; prothorax, median length of pronotum 0.172, width (inclusive of coxae) 0.399; mesothorax, width across anterior angles 0.399; abdomen, greatest width (at segment III) 0.431; tube (segment X, only), length 0.180, greatest subbasal width 0.079, least apical width 0.042; seta I on IX 0.130, II 0.146, III 0.160.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	50	64	91	88	72	63	56	37
Width (microns):	46	36	45	44	34	28	26	14
Total length of antenna, 0.521 mm.								

Male (macropterous). — Smaller and more slender than female, but otherwise very similar to it in color and structure.

Measurements of male (allotype), in mm.: Length about 2.23 (nearly fully distended, 2.66); head, total median length 0.283, width across eyes 0.189, greatest width across cheeks 0.209, least width near base 0.174; postocular setae, length 0.100, interval 0.169; mouth-cone, length beyond posterior dorsal margin of head 0.164; prothorax, median length of pronotum 0.172, greatest width (inclusive of coxae) 0.364; antero-marginal setae, length 0.023, antero-angulars 0.120, mid-laterals 0.082, epimerals 0.090, postero-marginals 0.107, coxals 0.060; pterothorax, width across anterior angles 0.372; fore wings, length 1.01, width near base 0.090, width at middle

0.060, greatest subapical width 0.082; lengths of subbasal setae 0.073, 0.087, and 0.080, respectively; abdomen, greatest width (at segment II) 0.361; tube (segment X, only), length 0.168, greatest subbasal width 0.075, least apical width 0.039; seta I on segment IX 0.133, II 0.063, III 0.196; terminal setae 0.196.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	45	61	85	81	71	62	54	38
Width (microns):	42	34	43	41	31	26	24	14
Total length of antenna, 0.497 mm.								

CALIFORNIA: Palo Alto, August 4, 1927, Henry E. Guerlac, 1 ♀ (holotype), from dead willow branch; San Mateo, August 3, 1927, J. D. H., 20 ♀♀ and 6 ♂♂ (including allotype), from dead willow branches.

Aside from *affinis*, in which the third antennal segment is differently formed and the tube more stout, this is the only New World species at present known in which the middle and hind tibiae are dark and the metanotum smooth basally.

62. *Hoplandrothrips salicacearum*, sp. nov.

Female (macropterous). — Length about 2.8 mm. (fully distended, 3.5 mm.). Color brown or blackish brown, with bright red internal pigmentation; legs about concolorous with body, all tarsi and the tips of all tibiae paler (sometimes nearly yellow), the fore tibiae paler than the others and yellow or yellowish also at base; fore wings distinctly darkened in scale, at base, and also in about second third, paler in the intervening portion and almost colorless apically; antennae with segments I and II blackish brown and concolorous with head, II paler and more yellowish apically and medially, III yellow in basal two-thirds, more extensively so along inner surface, infusate apically, IV-VIII much darker than III, usually with their basal two-fifths, one-third, and one-fifth, respectively, yellow or yellowish, or dappled with yellow.

Head nearly 1.5 times as long as greatest width, which is across cheeks; cheeks subparallel, only slightly arched, narrowed abruptly to eyes and converging to basal collar, the least subbasal width scarcely 0.9 the greatest width; dorsal surface subreticulate throughout, excepting only in a small median area behind the posterior ocelli, the reticles on the latero-dorsal and latero-ventral surfaces slightly asperate, the cheeks serrate throughout; vertex closely polygonally reticulate, rounded rather

than subconical, very slightly produced and only a little overhanging, bearing the median ocellus at its extremity; postocular setae brown, paler apically, with dilated tips which are slightly divided, their length only 36-37 microns, interval usually 186-195, distance from eyes 20-30; other cephalic setae small, brown, pointed, about four lateral pairs arising from tubercles. Eyes normal to the genus, rounded, the width across them about 0.9 the greatest width across cheeks, their greatest dorsal length about 0.3 that of head, in one caustic-treated topotypic paratype measuring as follows in microns: dorsal length 115, dorsal width 69, dorsal interval 94, ventral length 104, ventral width 63, ventral interval 106. Ocelli normal, 24-26 microns in diameter, the median one with its posterior margin on a line with anterior margin of eyes, the posterior pair 34 microns apart and 27-29 from median ocellus. Antenna thoroughly typical; segment III about three times as long as wide, with profile of inner surface distinctly sigmoid and with extreme base of pedicel tipped slightly outward; segment VIII only slightly narrowed basally and thus rather broadly attached to VII, with a slight subbasal constriction; sense-cones moderately stout, nearly pointed, that on inner surface of III about 30 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone narrowed apically but with labium rounded; labrum surpassing labium, its tip about 196 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum somewhat more than 0.5 the length of head and contained nearly 2.3 times in the trans-coxal breadth, its dorsal surface sculptured throughout, though more faintly at middle; all major setae present, dark brown, with broadly dilated and somewhat divided tips, unusually short, the antero-marginals (in holotype) 29 microns long, antero-angulars 30, midlaterals 38, epimerals 40, postero-marginals 35, coxals 34. Pterothorax. broader than prothorax, widest across anterior angles; metanotum polygonally subreticulate, without a smooth median area between the two large setae, all of the reticles almost uniform in size and nearly equilateral. Legs normal; fore femora of larger individuals with two teeth and fore tibiae with one; fore tarsi with a stout tooth near base. Wings normal, fore pair about 1.4 mm. long, about 131 microns wide at basal third, 92 microns at the narrowest point just beyond middle, and 119 microns

subapically; posterior margin with 13 or 14 accessory setae, the subbasal setae unusually short, pale yellow, and respectively 41, 46, and 56 microns long, I and II dilated apically, III pointed.

Abdomen distinctly broader than pterothorax, the sculpture of its dorsal surface heavier than usual, median tergite of segment I subreticulate; tube (segment X, only) scarcely two-thirds the length of head, about 2.5 times as long as its greatest subbasal width (which is across the basal collar), this width about twice that of apex, its sides slightly concave near base; terminal setae pointed, dark brown, their length (224 microns) less than that of tube; lateral abdominal setae pale yellowish or brownish (on the whole much paler than those of head and prothorax), all with pale dilated tips except the lowermost pair on VI-IX, which are pointed; setae I and II on IX dilated at apex.

Measurements of female (holotype), in mm.: Length about 2.81 (fully distended, 3.51); head, total median length 0.379, width across eyes 0.237, greatest width across cheeks 0.255, least width near base 0.227, width across basal collar 0.237; prothorax, median length of pronotum 0.206, width (inclusive of coxae) 0.469; mesothorax, width across anterior angles 0.521; abdomen, greatest width (at segment III) 0.566; tube (segment X, only), length 0.244, greatest subbasal width 0.097, least subapical width 0.047; seta I on segment IX 0.120, II 0.123, III 0.133.

Antennal segments:    1    2    3    4    5    6    7    8

Length (microns):    62 78 146 124 109 84 73 57

Width (microns):    56 43 48    19    40 34 30 18

Total length of antenna, 0.733 mm.

Male macropterous). -- Very similar to female in color and structure, differing merely in the usual ways.

Measurements of male (allotype), in mm.: Length about 2.38 (fully distended, 2.78); head, total length 0.332, width across eyes 0.209, least width just behind eyes 0.199, greatest width across cheeks 0.221, least width near base 0.202, width across basal collar 0.207; eyes, dorsal length 0.099; median ocellus, diameter 0.024; posterior ocelli, diameter 0.024, interval 0.030, distance from median ocellus 0.027; postocular setae, length 0.059, interval 0.170; mouth-cone, length beyond posterior dorsal margin of head 0.175; prothorax, median length of pronotum 0.178, greatest width (inclusive of coxae) 0.385;

antero-marginal setae, length 0.020, antero-angulars 0.083, mid-laterals 0.037, epimerals 0.050, postero-marginals 0.043; fore wings, length 1.18; abdomen, greatest width (at segment II) 0.417; tube (segment X, only), length 0.210, greatest subbasal width 0.080, least apical width 0.041; seta I on segment IX 0.124, II 0.057, III 0.142; terminal setae 0.188.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	54	70	119	107	97	80	68	53
Width (microns):	49	39	45	46	36	29	26	17
Total length of antenna, 0.646 mm.								

COLORADO: Fraser, July 8 and 9, 1927, J. D. H., 18 ♀♀ and 5 ♂♂ (including holotype and allotype), from stumps of poplar trees felled by beavers.

UTAH: Stockmore, July 13 and 14, 1927, J. D. H., 7 ♀♀ and 2 ♂♂, from dead poplar and willow trees.

CALIFORNIA: San Mateo, August 3, 1927, J. D. H., 6 ♀♀ and 10 ♂♂, from dead willow.

With *virago* and *gynandrus* the present species forms a compact group in which the fore femora and tibiae of larger individuals of both sexes are armed. Of these species, *virago* differs in having dark antennae, while in *gynandrus* the wings are paler, the major setae and the third antennal segment shorter, and the metanotum differently sculptured.

### 63. *Hoplandrothrips costano*<sup>1</sup>, sp. nov.

Female (macropterous). — Length about 2.4 mm. (fully distended, 3.0 mm.). Color brown or blackish brown, with bright red internal pigmentation; legs blackish brown, with only the tarsi and fore tibiae slightly paler; fore wings distinctly darkened in a little more than basal half, darkest in scale and in about second fourth, almost colorless beyond the narrowed area near middle; antennae with segments I and II blackish brown and about concolorous with head, II paler and more yellowish apically and medially, the remainder of antennae nearly uniform dark brown, with only the basal third of segment III and the narrow basal portion of the two succeeding segments paler.

Head about 1.4 times as long as greatest width, which is across cheeks; cheeks only slightly arcuate, narrowed abruptly

1) Named after the Costanoam (Mutsun) of American Indians, who inhabited California south of the Golden Gate.



to eyes and converging to basal collar, the least subbasal width a little more than 0.8 the greatest width; dorsal surface subreticulate throughout, excepting only in a small median area behind the posterior ocelli, the reticles on the latero-dorsal and latero-ventral surfaces strongly asperate, the cheeks thus conspicuously serrate throughout; vertex closely polygonally reticulate, rounded rather than subconical, very slightly produced and only a little overhanging, bearing the median ocellus at its extremity; postocular setae pale yellowish brown, colorless apically, with rather broadly dilated tips which are slightly divided, their length (in holotype) 52 microns, interval about 185, distance from eyes about 32; other cephalic setae small, pointed, pale yellowish, about four lateral pairs arising from tubercles which, in larger specimens, are large and prominent. Eyes normal to the genus, rounded, the width across them nearly 0.9 the greatest width across cheeks, their greatest dorsal length about 0.3 that of head, in one caustic-treated paratype (with head 357 microns long) measuring as follows in microns: dorsal length 111, dorsal width 69, dorsal interval 85. Ocelli normal, 19-21 microns in diameter, the median one with its middle on a line with anterior margin of eyes, the posterior pair about 35 microns apart and 32 from median ocellus. Antennae thoroughly typical; segment III about 2.35 times as long as wide, with profile of inner surface distinctly sigmoid, and with extreme base of pedicel tipped slightly outward; segment VIII slightly narrowed basally but rather broadly attached to VII, with a slight subbasal constriction; sense-cones moderately stout, nearly pointed, that on inner surface of III about 29 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone narrowed apically but with the labium rounded; labrum surpassing labium, its tip about 207 microns beyond posterior dorsal margin of head.

Prothorax with median line of pronotum about 0.56 the length of head and contained about 2.35 times in the transcoxal breadth, its dorsal surface lightly sculptured throughout, save for a small area at middle; all major setae present, yellowish brown basally but pale in about apical half (especially the more posterior pairs, the anterior ones usually darker), with broadly dilated rounded tips, the antero-marginals (of holotype) about 47 microns, antero-angulars 60, midlaterals 54,

epimerals 97, postero-marginals 79, coxals 42. Pterothorax about equal in width to prothorax, broadest across anterior angles; metanotum distinctly and rather heavily subreticulate, without a smooth median area near base between the two large setae. Legs normal, fore femora never toothed, fore tarsi with a stout tooth near base. Wings normal, fore pair about 104 microns wide at basal third, 70 microns at the narrowest point just beyond middle, and 87 microns subapically, posterior margin with 10-13 accessory setae, the subbasal setae pale yellowish, all of them dilated apically, and respectively 73, 80, and 83 microns long.

Abdomen about equal in width to pterothorax, the sculpture of its dorsal surface heavier than usual; median tergite of segment I subreticulate; tube (segment X, only) about 0.55 the length of head, about 2.2 times as long as its greatest subbasal width (which is across the basal collar), this width scarcely twice that of apex, its sides slightly concave near base; terminal setae dark brown, pointed, their length (about 280 microns) much greater than that of tube; lateral abdominal setae pale yellowish or brownish, scarcely paler than those of head and prothorax, all with pale dilated tips except the lowermost pair on VIII and IX, which are pointed; setae I and II dilated at apex.

Measurements of female (holotype), in mm.: Length about 2.39 (fully distended, 3.03); head, total median length 0.350, width across eyes 0.218, greatest width across cheeks 0.249, least width near base 0.210, width across basal collar 0.221; prothorax, median length of pronotum 0.196, width (inclusive of coxae) 0.462; mesothorax, width across anterior angles 0.465; abdomen, greatest width (at segment III) 0.463; tube (segment X, only), length 0.195, greatest subbasal width 0.087, least apical width 0.047; seta I on segment IX 0.104, II 0.133, III 0.166.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	53	74	108	97	83	74	64	44
Width (microns):	49	41	46	44	37	29	27	15
Total length of antenna, 0.597 mm.								

Male (macropterous). — Smaller and more slender than female, but otherwise very similar to it in color and structure.

Measurements of male (allotype), in mm.: Length about 2.37 (partially distended, 2.57); head, total median length 0.329, width across eyes 0.203, least width just behind eyes

0.199, greatest width across cheeks 0.225, least width near base 0.189, width across basal collar 0.196; postocular setae, length 0.096, interval 0.174; mouth-cone, length beyond posterior dorsal margin of head 0.174; prothorax, median length of pronotum 0.206, greatest width (inclusive of coxae) 0.426; antero-marginal setae, length 0.024, antero-angulars 0.119, mid-laterals 0.076, epimerals 0.092, postero-marginals 0.103, coxals 0.060; pterothorax, width across anterior angles 0.462; fore wings, length 1.1, width near base 0.102, width at middle 0.070, greatest subapical width 0.093, lengths of subbasal setae 0.076, 0.082, and 0.055, respectively; abdomen, greatest width (at segment II) 0.403; tube (segment X, only), length 0.172, greatest subbasal width 0.083, least apical width 0.043; seta I on segment IX 0.103, II 0.063, III 0.192; terminal setae 0.273.

Antennal segments: 1 2 3 4 5 6 7 8

Length (microns): 53 70 104 95 82 73 63 16

Width (microns): 47 37 41 43 34 28 24 15

Total length of antenna, 0.586 mm.

CALIFORNIA: San Mateo, August 3, 1927, J. D. H., 60 ♀♀ and 49 ♂♂, from dead willow branches.

This species could easily be mistaken for the eastern *virago*, but the fore femora and tibiae are never toothed in the female and the terminal abdominal setae are much longer.

#### 64. *Gastrothrips alticola*, sp. nov.

Female (apterous). --- Length about 2.1 mm. (fully distended, 2.6 mm.). Color nearly black, completely and opaquely so in abdominal segments VI-VIII, the thorax and most of basal three-fourths of tube blackish brown, internal pigmentation red; legs nearly concolorous with body, but with the fore tibiae yellowish brown (paler at apex and shaded with dark gray), and the middle and hind tarsi yellowish brown and paler than their tibiae, which are brown at tip; antennae with segments I, II, and IV-VIII nearly black, except that segment II is brown beyond, shaded along inner surface and with a dark cloud (often indistinct) at basal third.

Head about 1.3 times as long as greatest width across cheeks, which is a trifle greater than the width across eyes, the former only slightly convex, distinctly converging to eyes and also posteriorly, where the least width of the head is about 0.85 the greatest width; vertex flat, neither produced

nor overhanging, its surface indistinctly roughened; surface of rest of head smooth and shining, the few indistinct anastomosing lines confined to sides and base, and producing little or no serration of the cheeks; postocular setae 100 (83)<sup>2</sup> microns long, 163 (161) apart, and about 19 from posterior margin of eyes, dark brown in color, with pointed tips; cheeks with three or four pairs of lateral, moderately stout, pointed, brown setae, of which the longest are about 16 microns. Eyes subrectangular in dorsal aspect, scarcely protruding anteriorly, moderately small, about 0.27 the length of head, about 0.44 as wide as their interval, and with a few larger facets at outer posterior angles, the interval between eyes across front of head about 0.83 the axial distance from their posterior margins to base of head; dorsal length of eyes (77) microns, dorsal width (51), least dorsal interval (115), ventral length (80), ventral width (48), least ventral interval (122). Ocelli wanting. Antennae thoroughly typical of the genus in form and chaetotaxy; segment VII with the pedicel slender, VIII narrowed basally; segment III with two sense-cones, both of them ventral, one near inner, the other on outer, surface; IV with three sense-cones, of which two are on the inner and one is on the outer, surface; V 1 (1+1), VI 1 (1+1), VII 1 dorsally.

Prothorax across coxae 2.1 times the median length of pronotum, which is about 0.62 as long as head; pronotum with partial median apodeme and with the anterior margin slightly thickened, the posterior margin lightly sculptured; epimeron not fused with pronotum; major setae all present, dark brown, with pale pointed tips, the antero-marginals 31 (24) microns, antero-angulars 20 (24), midlaterals 24 (25), epimerals 86 (90), postero-marginals 80 (72), coxals 23 (20). Wings wanting. Fore femora stout, fore tarsi without tooth.

Abdomen large and broad, 1.42 (1.41) times the width of prothorax across coxae; anterior sterna longer than corresponding terga and with their anterior margins arched forward; abdominal setae pointed, all dark brown with pale tips; segment IX with the three major pairs 182-185 (167-197) microns long; tube (segment X, only) 0.73 (0.77) the length of head,

2) In this description of the female, the proportions or measurements of a caustic-treated paratype are often given after those of the holotype, and, in every case, they are enclosed in parentheses.

2.0 (2.2) times as long as greatest subbasal width, evenly tapering to apical third or fourth, then abruptly narrowed to extreme tip, where its width is a trifle less than one-half the greatest width, its surface squamose and faintly longitudinally rugose.

Measurements of female (holotype and one paratype, those of latter in parentheses), in mm.: Length about 2.06 (2.06), fully distended, 2.56 (2.53); head, total length 0.283 (0.291), width across eyes 0.218 (0.218), least width just behind eyes 0.213 (0.213), greatest width across cheeks 0.221 (0.223), least width near base 0.188 (0.192), width across basal collar 0.190 (0.195); prothorax, median length of pronotum 0.175 (0.176), width (inclusive of coxae) 0.367 (0.374); pterothorax, width across anterior angles 0.360 (0.375); abdomen, greatest width (at segment IV) 0.522 (0.529); tube (segment X, only), length 0.206 (0.224), greatest subbasal width 0.103 (0.102), least apical width 0.049 (0.049); terminal setae, length 0.121 (0.106).

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	44	73	80	74	71	69	50	45 (holotype)
	55	74	81	74	73	69	49	45 (paratype)
Width (microns):	50	43	39	42	42	37	28	16 (holotype)
	51	43	40	43	42	36	28	17 (paratype)
Total length of antenna, (0.520) mm.								

Male (apterous). — Apparently identical with female in color, but differing markedly in the following features: Prothorax enlarged, with a heavy complete median apodeme which is joined to the thickened anterior margin; antero-marginal setae 6 microns long, antero-angulars 33, midlaterals 67, epimerals 120, postero-marginals 149, coxals 24; fore coxae with about four pairs of additional stout setae; fore femora enlarged and with a group of about seven slender hairs on posterior angles; fore tibiae and tarsi enlarged, the latter each with a long, slightly curved, stout tooth; anterior angles of mesothorax produced to form a slender tooth whose tip is up-turned.

Measurements of male (allotype, caustic-treated), in mm.: Length about 2.03 (fully distended, 2.44); head, total length 0.276, width across eyes 0.193, least width just behind eyes 0.192, greatest width across cheeks 0.195, least width near base 0.176, width across basal collar 0.179; lateral length

of cephalic process (measured from anterior margin of eyes) 0.013; eyes, dorsal length 0.077, dorsal width 0.048, dorsal interval 0.098, ventral length 0.070, ventral width 0.043, ventral interval 0.107; postocular setae, length 0.122, interval 0.144, distance from eyes 0.016; mouth-cone, extent beyond posterior dorsal margin of head 0.125; prothorax, median length of pronotum 0.249, width (inclusive of coxae) 0.426; mesothorax, greatest width (across anterior angles) 0.465; abdomen, greatest width (at segment IV) 0.451; tube (segment X, only), length 0.220, greatest subbasal width 0.096, least apical width 0.049; terminal setae, length 0.120; seta I on abdominal segment IX, length 0.166, II 0.182, III 0.199.

Antennal segments: 1 2 3 4 5 6 7 8

Length (microns): 57 71 78 71 68 64 45 39

Width (microns): 48 41 36 37 37 35 27 15

Total length of antenna, 0.493 mm.

PERU: Shishmay (about 20 km. east of Huanuco), Departamento de Huanuco (Andes, elevation ca. 3000 m.), September 15-21, 1937, Felix Woytkowski, 35 ♀♀ and 10 ♂♂, mostly from dead shrubs [Hood Nos. 1438, 1444, 1448, and 1449].

The affinities of this typical *Gastrothrips* are discussed at the close of the following description of the allied *monticola*.

#### 65. *Gastrothrips monticola*, sp. nov.

Female (brachypterous). — Length about 2.2 mm. (fully distended, 2.7 mm.). Color nearly black, completely and opaquely so in abdominal segments VI-VIII, the thorax and most of basal three-fourths of tube blackish brown, internal pigmentation red; legs nearly concolorous with body, but with the fore tarsi brownish yellow, the fore tibiae deep brown (paler at either end and shaded with black at middle), and the middle and hind tarsi paler than their tibiae; antennae nearly black, except that segment II is brown apically and III is yellow in basal sixth and dark brown in apical half; wings dark brown.

Head about 1.25 (1.23)<sup>4</sup> times as long as greatest width, the width across cheeks equal to that across eyes, the former

4) In this description of the female, the proportions or measurements of the caustic-treated paratype are often given after those of the holotype, and, in every case, they are enclosed in parentheses.

only slightly convex and converging posteriorly, where the least width of the head is about 0.86 the greatest width; vertex flat, neither produced nor overhanging, its surface indistinctly longitudinally rugose; surface of rest of head smooth and shining, the few and very faint anastomosing lines confined to sides and base, and producing no serration of the cheeks; postocular setae 94 (103) microns long, 160 (156) apart, and about 16 from posterior margin of eyes, brown in color, with pale pointed tips; cheeks with three or four pairs of lateral, moderately stout, pointed, brown setae, of which the longest are about 19 microns. Eyes subrectangular in dorsal aspect, protruding anteriorly, moderately small, about 0.3 the length of head, about half as wide as their interval, and with a few larger facets at outer posterior angle, the interval between eyes across front of head about 0.7 the axial distance from their posterior margin to base of head; dorsal length of eyes (77) microns, dorsal width (53), least dorsal interval (102), ventral length (69), ventral width (50), least ventral interval (107). Ocelli small, (11-13) microns in diameter, the median one with its center about (15) microns behind anterior margin of eyes, the posterior pair about (69) microns apart and (35) from median one. Antennae thoroughly typical of the genus in form and chaetotaxy; segment VII with the pedicel slender, VIII narrowed basally; segment III with two sense-cones, both of them ventral, one near inner, the other on outer, surface; IV with three sense-cones, of which two are on the inner and one is on the outer, surface; V 1 (1+1), VI 1 (0+1), VII 1 dorsally.

Prothorax across coxae 2.17 (2.3) times the median length of pronotum, which is about 0.6 (0.56) as long as head; pronotum with partial median apodeme and with the anterior margin slightly thickened, the posterior margin very lightly sculptured; epimeron not fused with pronotum; major setae all present, dark brown with pale, nearly pointed tips, the antero-marginals 17 (26) microns, antero-angulars 40 (36), midlaterals 42 (50), epimerals 123 (117), postero-marginals 80 (87), coxals 35 (29). Wings dark brown, about attaining base of abdomen, 192 (154) microns long. Fore femora stout, fore tarsi without tooth.

Abdomen large and broad, 1.39 (1.32) times the width of prothorax across coxae; anterior sterna longer than corresponding terga and with their anterior margins arched for-

ward; abdominal setae pointed, most of them dark brown with pale tips, those on basal five or six segments nearly black, those on segment IX more yellowish; IX with the three major pairs 224-239 (196-207) microns long; tube (segment X, only) 0.97 (0.88) the length of head, 2.7 (2.6) times as long as greatest subbasal width, evenly tapering to apical fourth, sharply constricted at extreme tip, where its width is about one-half the greatest width, its surface squamose and faintly longitudinally rugose.

Measurements of female (holotype and paratype, those of latter in parentheses), in mm.: Length about 2.2 (1.93) (fully distended, 2.7 (2.36); head, total length 0.277 (0.255), width across eyes 0.221 (0.207), least width just behind eyes 0.220 (0.204), greatest width across cheeks 0.221 (0.207), least width near base 0.189 (0.175), width across basal collar 0.192 (0.178); prothorax, median length of pronotum 0.163 (0.143), width (inclusive of coxae) 0.354 (0.328); pterothorax, width across anterior angles 0.393 (0.346); abdomen, greatest width (at segment IV) 0.491 (0.434); tube (segment X, only), length 0.268 (0.224), greatest subbasal width 0.099 (0.086), least apical width 0.051 (0.043); terminal setae, length (0.153).

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	61	69	85	73	70	64	14	39 (holotype)
	52	60	77	68	69	57	42	38 (paratype)
Width (microns):	47	41	40	42	41	37	28	15 (holotype)
	42	38	37	38	37	35	27	15 (paratype)
Total length of antenna, (0.169) mm.								

Male (brachypterous). -- Apparently identical with female in color, but differing markedly in the following features: Postocellar setae long, 58-96 microns; prothorax enlarged, with a heavy complete median apodeme which is joined to the thickened anterior margin, and with very long, slender, extremely finely pointed setae, of which the antero-marginals are 33 microns long, antero-angulars 80, midlaterals 110, epimerals 184, postero-marginals 168, coxals 47; fore coxae in addition, with about four pairs of stout setae; fore femora enlarged and with a group of about eight slender hairs on posterior angles; fore tibiae and tarsi enlarged, the latter each with a long, nearly straight, stout tooth; anterior angles of mesothorax produced to form a slender tooth whose tip is upturned.



Measurements of male (allotype, caustic-treated), in mm.; Length about 2.0 (fully distended, 2.43); head, total length 0.259, width across eyes 0.206, least width just behind eyes 0.203, greatest width across cheeks 0.206, least width near base 0.179, width across basal collar 0.182; lateral length of cephalic process (measured from anterior margin of eyes) 0.006; eyes, dorsal length 0.074, dorsal width 0.051, dorsal interval 0.104, ventral length 0.076, ventral width 0.050, ventral interval 0.107; median ocellus, diameter 0.013; posterior ocelli, diameter 0.013, interval 0.073, distance from median ocellus 0.035; postocular setae, length 0.123, interval 0.151, distance from eyes 0.015; postocellar setae, length 0.058-0.096; length of mouth-cone (extent beyond posterior dorsal margin of head) 0.126; prothorax, median length of pronotum 0.214, width (inclusive of coxae) 0.434; mesothorax, greatest width (across anterior angles) 0.461; fore wings, length 0.239; abdomen, greatest width (at segment IV) 0.430; tube (segment X, only), length 0.241, greatest subbasal width 0.099, least apical width 0.048; seta I on abdominal segment IX, length 0.220, II 0.231, III 0.210.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	55	66	77	67	66	63	45	42
Width (microns):	48	42	39	41	40	36	27	16
Total length of antenna, 0.481 mm								

PERU: Piedras Grandes, Departamento de Huanuco (Andes, elevation ca. 3000 m.), November 13-17, 1937, Felix Woytkowski, 2 ♀♀ and 1 ♂, «from a bush» [Hood No. 1475].

This is a typical member of the genus. Its closest relatives are doubtless *alticola* and *capitalis*, the former Peruvian and the latter Texan. From *alticola* it differs most noticeably in that the commonest form of the species is brachypterous, rather than apterous, and thus possesses ocelli, the antennae are much darker in coloration; the tube is long and slender, and, especially in the male, apparently, the head is less produced in front of the eyes. From *capitalis* it differs conspicuously in having the postocular setae much more widely separated.

#### 66. *Hoplothrips oriochares*, sp. nov.

Female (macropterous). — Length about 2.2 mm. (fully distended, 2.9 mm.). Color nearly uniform brown, tube orange-brown in basal half, yellow beyond, tipped with gray; legs

about concolorous with body, fore tibiae, all tarsi, and tips of fore femora and of middle and hind tibiae, yellowish; antennae almost uniform brown, concolorous with head, segment I a trifle paler basally, II yellowish apically, III yellow in about basal sixth; fore wings lightly washed with brown throughout, heavily darkened with brown in scale and to near the third subbasal seta, lightly margined with brown posteriorly, anterior half of apical half darkened, especially toward middle of wing; major setae pale brownish yellow, terminal ones brown.

Head 1.26 times as long as wide, scarcely prolonged in front of eyes, broadest across anterior third of cheeks, the width across eyes nearly 0.9 as great; cheeks curving evenly toward base and only a trifle more abruptly to eyes, without a notch at posterior angles of eyes; dorsum of head scarcely elevated along median line posteriorly, its surface lightly sculptured with the usual anastomosing lines, except medially and in the ocellar area, where it is smooth; vertex very slightly produced, rounded rather than subconical, bearing the forwardly-directed median ocellus at its apex; postocular setae sharply and finely pointed, 80-100 microns long. 157 apart, and 31 from eyes; setae on cheeks pale, pointed, moderately stout, about 11 microns long, and arising from slight eminences. Eyes not protruding, dorsal length 76 microns, dorsal width 59, dorsal interval 75, ventral length 73, ventral width 53, ventral interval 87. Ocelli 24-27 microns in diameter, the median one apparently smaller and with posterior margin slightly in advance of anterior margin of eyes, posterior ones about 35 microns apart and 23-29 from median ocellus (i. e., not symmetrically disposed in the unique type). Antennae with segment VIII roundly lanceolate and distinctly pedicellate, its pedicel flaring slightly outward at base; III with one moderately long (30 microns) stout sense-cone on inner surface and two on outer; IV with two similar sense-cones on either surface, V and VI each with one on either surface. Mouth-cone short, extending about 150 microns beyond posterior dorsal margin of head, its broadly rounded labium not attained by tip of labrum.

Prothorax with median line of pronotum about 0.65 that of head and contained in the trans-coxal width about 2.26 times, its surface lightly sculptured with the usual anastomosing lines along posterior and anterior margin and at sides; median apodeme wanting; all usual setae present, pointed, the antero-

marginals minute (13 microns), the others measuring as follows in microns: antero-angulars 52-54, midlaterals 79, epimerals 80-87, postero-marginals 127, coxals 53 (two or three pairs of smaller coxal setae present). Pterothorax broader than prothorax; fore wings sabre-shaped, 1.06 mm. long, their greatest width one-tenth their length; posterior margin with 12 accessory setae; subbasal setae respectively 66-70, 115-120, and 106 microns long. Legs normal; fore tarsi with a short (17 microns) straight tooth.

Abdomen broad and heavy, about 1.5 times as broad as trans-coxal width of prothorax, its dorsum lightly subreticulate in the median tergite of segment I, at sides of tergum II, and (more strongly) in a narrow area across base of tergum IX, the rest smooth; tube (segment X, only) 0.8 the length of head and 2.1 times as long as basal width, the latter about 2.24 times the apical width, sides of tube nearly straight; major setae long, all of them pointed or nearly so, seta I on IX about 135 microns long, II 174, III 170; terminal setae 224.

Measurements of female (holotype), in mm.: Length about 2.2 (fully distended, 2.91); head, total length 0.273, width across eyes 0.192, greatest width across cheeks 0.216, least width near base 0.190, width across basal collar 0.192; prothorax, median length of pronotum 0.178, width (inclusive of coxae) 0.402; mesothorax, width across anterior angles 0.421; abdomen, greatest width 0.602; tube (segment X, only), length 0.218, greatest subbasal width 0.103, least apical width 0.046.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	59	73	89	82	70	64	58	53
Width (microns):	49	35	41	40	38	34	27	19
Total length of antenna, 0.518 mm.								

PERU: Piedras Grandes, Departamento de Huanuco (Andes, ca. 3000 m. elev.), November 2, 1937, Felix Woytkowski, 1 ♀, «from various single flowers» [Hood No. 1460].

Though the unique macropterous type was taken on a flower, the species is doubtless a bark dweller. The almost uniform dark antennae suggest *fuscicornis*, described from Maryland, but that species has the sides of the head straight and abruptly rounded to the eyes, and the tube is much more slender.

67. *Holopothrips orites*, sp. nov.

Female (macropterous). — Length about 2.7 (2.9)<sup>6</sup> mm. (fully distended, about 3.3 (3.5) mm.). Unicolorous, the head, thorax, abdomen, and legs chestnut-brown, with all tarsi, apices of middle and hind tibiae, and the fore tibiae, yellowish brown, the fore tibiae shaded with darker brown or gray from near base to about apical fourth; tube nearly black in basal half, paler in apical half; antennae with segment I concolorous with head, II yellow at apex and narrowly dark blackish brown across base and along either surface, remainder light brown, III and IV largely lemon-yellow, lightly shaded with brown in apical fourth and third, respectively, IV darker than III; V and VI bright yellow in about basal half, their apical halves and all of VII and VIII brown; fore wings yellowish gray in scale and to the third subbasal seta, faintly yellowish beyond, with margins narrowly pale brown; internal pigmentation bright red.

Head 1.66 (1.64) times as long as wide, broadest across eyes; cheeks nearly straight, very slightly concave at anterior third, and roundly narrowed to a slight collar-like widening at base; dorsal and lateral surfaces closely and finely striate throughout, except in the ocellar area, where the sculpture is polygonally subreticulate; postocular setae dark brown, nearly pointed, 74 (80) microns long, 120 (130) apart, and arising 43 (46) behind eyes; other cephalic setae minute, brown, and pointed. Eyes essentially as in genotype, their dorsal length (148) microns, greatest dorsal width (96), least dorsal interval in front of median ocellus (51), least dorsal interval behind posterior ocelli (77), ventral length (120), greatest ventral width (77), least ventral interval (88). Ocelli typical, (33-34) microns in diameter, the posterior pair (30) microns apart and about (30) from median ocellus. Antennae typical; sense-cones long, slender, pointed, that on inner surface of segment III 44 microns long, their disposition on inner (and outer) surfaces of the segments as follows: III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone broadly rounded at tip, extending 156 (168) microns beyond posterior dorsal margin of head, labrum not surpassing labium.

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6) Here, again, the measurements of a caustic-treated paratype are frequently given, in parentheses, after those of the holotype. In the case of this species, it should be added, the paratype represents the average size more closely than the holotype.

**Prothorax** 0.42 (0.44) as long as head and (inclusive of coxae) about 2.5 times as wide as long; pronotum often with short median thickening; all major setae present, nearly black, truncate or slightly dilated and somewhat divided apically, the antero-marginals 22 (50) microns, antero-angulars 57 (64), midlaterals 80 (110), epimerals 116 (147), postero-marginals 113 (132), coxale (67). **Metanotum** with a central triangular area which is exceedingly finely longitudinally striate. **Fore wings** ensiform, about 1.5 mm. long, slightly broader near basal third, where they are about 0.127 mm. wide, thence narrowing slightly to apex, with 13-15 accessory setae; sub-basal setae nearly black, slightly dilated at tip, and respectively 93, 106, and 132 microns long.

**Abdomen** broader than pterothorax, widest at segment III; tube 0.73 (0.72) as long as head and about 2.7 (2.8) times as long as greatest width near base, sides almost perfectly straight, apical width about 0.55 (0.55) basal width.

**Measurements** of female (holotype and a caustic-treated paratype, those of latter in parentheses), in mm.: Length about 2.74 (2.94) (fully distended, 3.32 (3.49); head, total length 0.371 (0.407), width across eyes 0.224 (0.242), least width shortly behind eyes 0.217 (0.234), greatest width across cheeks (at posterior angles of eyes) 0.222 (0.235), least width near base 0.185 (0.206), width across basal collar 0.186 (0.207); prothorax, median length of pronotum 0.157 (0.178), width (inclusive of coxae) approximately 0.389 (approximately 0.420); mesothorax, width across anterior angles 0.426 (0.468); abdomen, greatest width (at segment III) 0.511 (0.557); tube (segment X, only), length 0.270 (0.294), greatest subbasal width 0.100 (0.106), least apical width 0.055 (0.058), terminal setae 0.266; seta I on abdominal segment IX, length 0.241, II 0.242, III 0.188.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	75	121	101	96	82	96	43 (holotype)
	60	79	129	108	106	85	73	47 (paratype)
Width (microns):	50	34	42	40	37	32	27	14 (holotype)
	55	37	43	42	37	34	30	14 (paratype)
Total length of antenna, (0.687) mm.								

**PERU:** Shishmay (about 20 km. east of Huanuco, in the Andes, elevation about 3000 m.), Departamento de Huanuco,

7) Dorsal exposed length.

September 15-21, 1937, Felix Woytkowski, 13 ♀♀, from an unidentified shrub [Hood Nos. 1448 and 1449].

The unicolorous body, long head, and chaetotaxy indicate close relationship with both *hambletoni* and *permagnus*, particularly with the latter. In *hambletoni*, however, the metanotum is delicately polygonally reticulate (rather than extremely longitudinally striate), while in *permagnus* the antennae are differently colored and the two most anterior pairs of procoxal setae are minute.

68. *Holopothrips anacardii*, sp. nov.

Female (macropterous). — Length about 1.7 mm. (fully distended, about 2.0 mm.). Bicolorous, the body and legs lemon-yellow, the head partially, and the last two abdominal segments wholly, brown or blackish brown; head with a very narrow black vitta, strictly lateral in position, starting at posterior angles of eyes and tapering out just before base of head, the front of head and the area between eyes dark brown, continuous with a large paler brown spot (often lighter medially) which is semicircular in form and occupies nearly the entire width of head behind eyes and which arches posteriorly nearly to base of head; antennae with segment I dark brown and concolorous with front of head, II yellow, narrowly dark blackish brown across base and along either surface, III-VI uniform lemon-yellow, except that III is lightly shaded with brown in basal fourth, VII yellow in about basal fourth, its remainder and all of VIII gray-brown; fore wings brownish yellow basally, fading to nearly colorless in apical half, and with a distinct narrow brown post-median streak in second fourth; all setae, save only the brown terminal ones, nearly or quite colorless.

Head 1.16 (1.07)<sup>8</sup> times as long as wide, broadest behind middle of cheeks, the width across eyes only 0.8 as great; cheeks evenly convex and rounded, converging strongly to eyes and only slightly to base; surface of head perfectly smooth, except for the reticulated ocellar area, a few extremely delicate striae across base and in the median brown blotch, and a slight aciculation of the extreme lateral surface in the area of the black vitta, this latter producing a fine serration of the cheeks; postocular setae not definitely identifiable, though doubtless comprising one of the several pairs of minute

8) The measurements or proportions of a paratype are frequently given, in parentheses, after those of the holotype.

(10 microns) pointed colorless setae on dorsal and lateral surfaces of head. Eyes essentially as in genotype, their dorsal length 127 microns, greatest dorsal width 76 (84), least dorsal interval in front of median ocellus 10 (17), least dorsal interval behind posterior ocelli 24 (30). Ocelli typical, approximately 17 microns in diameter, forming a small, nearly equilateral triangle. Antennae typical; sense-cones moderately long, slender, pointed, that on inner surface of segment III about 26 microns long, their disposition on inner (and outer) surfaces of segments as follows: III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone broadly rounded at tip, extending 112 (134) microns beyond posterior dorsal margin of head, labrum slightly surpassing labium.

Prothorax slightly more than half as long as head and (inclusive of coxae) about 2.2 times as wide as long; pronotum without median thickening and without sculpture; all major setae present, colorless or slightly yeallowish, slightly dilated and somewhat divided apically, the antero-marginals 18 microns, antero-angulars 24, midlaterals 20, epimerals 50, postero-marginals 30, coxals 21. Metanotum with a central triangular area which is very delicately polygonally reticulate, the polygons nearly equilateral. Fore wings ensiform, about 0.84 mm. long, slightly broadest at about basal third, where they are 79 microns wide, narrowed slightly to middle, where their width is 66 microns, and somewhat broadened subapically (68 microns); subbasal setae nearly colorless, slightly dilated at apex, and respectively 23, 15, and 16 microns long; posterior margin of wings with 5 or 6 accessory setae.

Abdomen broader than prothorax, widest at segment IV; tube nearly 0.7 as long as head and about twice as long as greatest width near base, sides almost perfectly straight, apical width about 0.53 (0.056) basal width; seta I on abdominal segment IX dilated at apex.

Measurements of female (holotype and paratype, those of latter in parentheses), in mm.: Length about 1.69 (fully distended, 1.95); head total length 0.252, width across eyes 0.176 (0.186), greatest width across cheeks 0.217 (0.235), least width near base 0.203 (0.231); prothorax, median length of pronotum about 0.137, width (inclusive of coxae) 0.300 (0.298); mesothorax, width across anterior angles 0.321; abdomen, greatest width (at segment IV) 0.367; tube (segment X, only), length 0.171 (0.168), greatest subbasal width 0.086

(0.086), least apical width 0.046 (0.048), terminal setae 0.187, seta I on abdominal segment IX, length 0.111, II 0.179, III 0.110.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	36	52	66	57	61	53	45	36
Width (micron):	39	32	28	29	28	26	20	12
Total length of antenna,	0. 406 mm.							

Male (macropterous). — Identical with female in color and structure, except that the dorsal brown blotch on the head is paler; fore legs not enlarged, fore tarsi not toothed; glandular areas confined to sternum VIII, comprising the two usual transverse pairs, of which the subbasal is short, subelliptical, and limited to about lateral fifths of the segment, and the subapical is narrower and much longer, extending mediad beyond lateral third of the segment.

Measurements of male (allotype), in mm.: Length about 1.72 (fully distended, 1.90); head, total length 0.241, width across eyes 0.167, greatest width across cheeks 0.203, least width near base 0.183; eyes, dorsal length 0.117, greatest dorsal width 0.079, least dorsal interval in front of median ocellus 0.010, least dorsal interval behind posterior ocelli 0.020; median ocellus, diameter 0.017; posterior ocelli, diameter 0.016, interval 0.020, distance from median ocellus 0.025; mouth-cone, length beyond posterior dorsal margin of head 0.116; prothorax, median length of pronotum 0.130, greatest width (inclusive of coxae) 0.304; antero-marginal setae, length 0.013, antero-angulars 0.024, midlaterals 0.017, epimerals 0.053, postero-marginals 0.027, coxals 0.017; pterothorax, width across anterior angles 0.301; abdomen, greatest width (at segment II) 0.318; tube (segment X, only), length 0.158, greatest subbasal width 0.075, least apical width 0.040; seta I on abdominal segment IX 0.109, II 0.164, III 0.157; terminal setae 0.173.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	30	48	64	56	58	54	41	31
Width (microns):	37	29	26	26	26	23	19	11
Total length of antenna,	0.382 mm.							

BRAZIL: Bahia, 3 ♀♀ and 3 ♂♂, collected by Dr. Gregorio Bondar, on leaves of *Anacardium occidentale* [No. 691, his letter of March 17, 1926].

Though I have known this species for fifteen years, I have hesitated to describe it, because Morgan's *H. fulvus*, described



in 1929 from specimens taken also at Bahia by Dr. Bondar, but from cotton instead of *Anacardium*, resembles it closely in a number of features. However, in view of the fact that Morgan's type could not be found by those in charge of the collection at the U. S. National Museum or at the Bureau of Entomology and Plant Quarantine, when I made inquiry in 1937, and because Dr. Bondar was unable to send me freshly-collected material of the species in 1938, I have decided to describe the present specimens as new, on the basis of several important departures from Morgan's description. These apparent differences are perhaps best shown by means of the following tabulation:

*H. fulvus* Morgan. — «First two antennal segments, base of mouth cone, and ninth abdominal segment dark blackish brown, tube black . . . remainder of body, including legs, lemon yellow»; «head broadest at third fourth»; «eyes occupying about three-fifths the length of head»; «anterior marginals wanting»; «bristles capitate, except the terminal ones and those at posterior margin of ninth abdominal segment . . . [the latter setae] almost as long as tube».

*H. anacardii* Hood. — Color of body and appendages lemon-yellow, the head with a very narrow black vitta, strictly lateral in position, starting at posterior angles of eyes and tapering out just before base of head, the front of head and the area between eyes dark brown, continuous with a large paler brown spot, semicircular in form, occupying nearly the entire width of head behind eyes and curving posteriorly nearly to base of head; second antennal segment yellow, margined narrowly with blackish brown or black; head broadest behind middle of cheeks; eyes one-half the length of head; anterior marginal setae present, nearly equal in length to midlaterals; seta I on abdominal segment IX capitate and only 0.6 the length of tube.

#### 69. *Holopothrips pictus*, sp. nov.

? *Holopothrips signatus*, Moulton, Rev. de Ent., 9 (3-4): 378, 1938.

Male (macropterous). — Length about 1.6 mm. (fully distended, about 1.9 mm.). Bicolorous, the body and legs largely blackish brown, with only the first three abdominal segments lemon-yellow; head and posterior nine-tenths of prothorax somewhat darker than prothorax and last seven abdominal segments; third abdominal tergum with a brown transverse dash just behind the antecostal suture; fore tibiae, all tarsi, hind coxae and trochanters, extreme bases of hind femora, and tips of fore femora pale lemon-yellow, fore and middle trochanters and tips of hind tibiae brownish yellow; antennae with segment I dark brown and concolorous with head, II yellowish brown, narrowly dark blackish brown across base and along either surface, more extensively so on outer surface, III-VI uniform lemon-yellow, VII yellow in about basal fourth,

its remainder and all of VIII pale gray; fore wings dark brown in scale and to beyond the third subbasal seta, nearly colorless in second third, and darkened again in apical third.

Head 1.34 (1.27)<sup>9</sup> times as long as wide, broadest across cheeks shortly behind eyes, the width across eyes only slightly less; cheeks nearly straight in most of their length, converging strongly to eyes and distinctly to near base; dorsal and lateral surfaces of head sculptured throughout, the sculpture of the ocellar area and immediately behind it nearly squamose, that on remainder of head moderately heavy and somewhat asperate toward sides, the cheeks only finely serrate; postocular setae slightly dilated and divided apically, dark brown in color, 43 (41) microns long, 92 (99) apart, and 24 (21) from eyes. Eyes essentially as in genotype, a little less than half the length of head, those of the caustic-treated paratype with dorsal length 97 microns, greatest dorsal width 70, least dorsal interval in front of median ocellus 31, and least dorsal interval behind posterior ocelli 47. Ocelli typical, 21-23 microns in diameter, forming a small nearly equilateral triangle, the posterior pair 15 microns apart and 16 from median ocellus. Antennae typical; sense-cones moderately long, slender, pointed, that on inner surface of segment III about 25 microns long, their disposition on inner (and outer) surfaces of segments as follows: III 1 (2), IV 1 (3), V 1 (2), VI 1 (2), VII 1 dorsally. Mouth-cone broadly rounded at tip, extending 94 (130) microns beyond posterior dorsal margin of head, labrum scarcely surpassing labium.

Prothorax 0.44 (0.44) as long as head and (inclusive of coxae) about three times as wide as long; pronotum with a short weak median thickening, faintly subreticulate in anterior half medially, and with a few short faint striae near posterior margin and in front of postero-marginal setae; all major setae present, dark brown in color, except the epimerals, which are light brown, all slightly dilated and more or less divided apically, the antero-marginals 40 (47) microns, antero-angulars (42), midlaterals (55), epimerals 84 (77), postero-marginals 65 (64), coxals approximately 30. Metanotum with a central triangular area which is distinctly but finely polygonally reticulate, the polygons longitudinal. Fore wings ensiform,

9) The measurements or proportions of the paratype are frequently given, in parentheses, after those of the holotype.

about 0.84 mm. long, slightly broadest at about basal third, where they are 66 microns wide, slightly narrower and of nearly uniform width beyond; subbasal setae blackish brown, slightly dilated at apex, and respectively 50 (48), 50 (47), and 69 (66) microns long; posterior margin of wings with 5 accessory setae.

Abdomen narrower than pterothorax, broadest at segment III; sterna VI-VIII (only; not V to VIII) each with a short subbasal transverse glandular area extending across lateral fourths, and, also, each with a subapical area, somewhat narrower, extending completely across the segment; tube 0.61 as long as head and twice as long as greatest width near base, sides almost perfectly straight, apical width about 0.54 basal width; setae I and II on abdominal segment IX dilated at apex, III pointed, I 114 microns long, II 120, III 148.

Measurements of male (holotype and paratype, those of latter in parentheses), in mm.: Length about 1.64 (fully distended, 1.92); head, total length 0.234 (0.218), width across eyes 0.170 (0.171), least width just behind eyes 0.164 (0.162), greatest width across cheeks 0.174 (0.172), least width near base 0.150 (0.152); median length of pronotum 0.102 (0.097), width (inclusive of coxae) 0.287 (0.301); mesothorax width across anterior angles 0.286 (0.302); abdomen, greatest width (at segment III) 0.284 (0.290); tube (segment X, only), length 0.143, greatest subbasal width 0.072, least apical width 0.039, terminal setae, length 0.132.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	35	52	65	58	62	59	49	39 (holotype)
	35	53	65	58	62	57	48	39 (paratype)
Width (microns):	35	26	24	24	23	18	18	10 (holotype)
	36	27	26	24	23	21	19	12 (paratype)
Total length of antenna,	0.419 (0.417) mm.							

BRAZIL: São Paulo, September, 1935, Dr. Edson J. Hambleton, 2 ♂♂, taken with the types of *Holopothrips hilaris*, on «foliage of a small herbaceous plant in woods».

The species which Moulton recorded from Viçosa, Minas Gerais, Brazil, as *H. signatus* appears rather to be the present one, for the departures from typical *signatus* which he mentions are, with one possible exception, all characters of *pictus*. The hind femora of *signatus* are almost always clear pale yellow, its eyes are large; the prothoracic setae longer and paler, and the male has two pairs of similar, short, linear, glandular areas extending transverse across the lateral third (or

a little more) of the fifth to eighth abdominal sterna. In *pictus* the hind femora are dark and the glandular areas of the male are confined to the sixth to eighth abdominal sterna, with the anterior area on each segment short as in *signatus* and limited to the lateral fourth, or a little more, but with the posterior one in each instance extending completely across the segment.

70. *Adraneothrips peruviansis*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (fully distended, 1.6 mm.). Color nearly uniform blackish brown, with the head a trifle darker and the tube paler in about its apical half and also across extreme base; internal pigmentation bright red; all legs about concolorous with body, but with both ends of fore tibiae, tips of middle and hind tibiae, and all tarsi, yellowish brown; antennae with segments I and II dark brown and about concolorous with head, I paler basally, II paler medially and apically, III-VIII dark gray-brown, III yellowish in basal fourth or fifth, IV and V obscurely paler subbasally; fore wings pale brown throughout, with a prominent dark brown median streak in second and third fifths.

Head short, its total median length about 1.1 times its greatest width, which is across cheeks opposite posterior margins of eyes, the cheeks slightly convex, nearly straight throughout most of their length, curving abruptly to eyes and tapering to near base, the width across eyes (145 microns) much greater than the least width (127 microns) near base, the basal collar slightly projecting; vertex subconical rather than rounded, slightly overhanging, and bearing the median ocellus at its extremity; dorsal surface of head not at all elevated along median line posteriorly, nearly smooth, lateral surfaces striate, the cheeks serrate; postocular setae dark brown, rather broadly dilated and distinctly divided apically, 48-50 microns long, 72-77 apart, and about 13 from nearest facet of eyes; other setae brown, minute and pointed. Eyes large, about 0.36 as long as head, rounded dorsally and ventrally, not produced posteriorly on lower surface of head. Ocelli 13-14 microns in diameter, the posterior pair 18 microns apart and 15 from median ocellus, the latter with its anterior margin about 7 microns in advance of front margin of eyes. Antennae of normal form and structure; segment VI 2.25 times as long as wide, VII 2.1 times, VIII 3.3 times; sense-cones long and slender, that on inner surface of III about 26 microns long, their disposition on inner (and outer) surfaces of seg-

ments as follows: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone typical, broadly rounded at tip, moderate in length, extending about 98 microns beyond posterior dorsal margin of head.

Prothorax normal, along median line of pronotum about 0.6 the length of head and (inclusive of coxae) about 2.4 times as wide as long, its surface smooth save for a few transverse striae along posterior margin and two or three in front of postero-marginal setae; median apodeme short, black; all usual major setae present, dark blackish brown, broadly dilated and distinctly divided at apex, their lengths in microns as follows: antero-marginals 39-42, antero-angulars 30-35, midlaterals 44-50, epimerals 56-59, postero-marginals 56-59, coxals 26-36. Mesothorax broader than prothorax. Fore wings about 0.64 mm. long, broadest (56 microns) just beyond the third subbasal seta, narrowest (47 microns) just beyond middle, and slightly broadened (50 microns) near apex, usually with four, occasionally with only three, accessory setae, and with the subbasal setae blackish brown, dilated at apex, and respectively 43, 53, and 60 microns long.

Abdomen narrower than mesothorax and about equal in width to prothorax across coxae, of normal structure; median tergite of segment I longer (71 microns) than wide (50), its hind margin without pores; tube (segment X, only) nearly 0.7 as long as head, about twice as long as greatest subbasal width, which is about twice the apical width, its sides straight, its terminal setae brown and 103 microns long; all other abdominal setae brown or brownish, the larger wing-retaining ones darkest, those on apical segments pale and darkened only at base, all dilated apically with the exception of the lateral pair on VII and seta III on IX (which is about 113 microns long), seta I on IX 96 microns, II 108, intermediate seta (between I and II) 54.

Measurements of female (holotype), in mm.: Length about 1.30 (fully distended, 1.60); head, total median length 0.168, greatest width (across cheeks) 0.150, width across eyes 0.145, least width near base 0.127, width across basal collar 0.128; prothorax, median length of pronotum 0.096, greatest width (inclusive of coxae) 0.242; mesothorax, width across anterior angles 0.260; abdomen, greatest width (at segment III) 0.241; tube (segment X, only), length 0.114, greatest subbasal width 0.056, least apical width 0.025.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	30	42	53	56	48	45	40	33
Width (microns):	35	27	29	27	23	20	19	10
Total length of antenna, 0.347 mm.								

PERU: Rioja (Rio Negro; elevation about 900 m.), Dept. San Martin, November 12, 1936, Felix Woytkowski, 2 ♀♀ (including holotype), on *Adenaria floribunda* HBK. (det. by Dr. Paul C. Standley) [Hood No. 1162]; Rioja, November 24-25, 1936, F. W., 1 ♀, from dead branches and leaves [Hood No. 1155].

The short head, dark legs and antennae, and the disposition of the antennal sense-cones, readily define this species.

71. *Adraneothrips microsetis*, sp. nov.

Female (apterous). — Length about 1.5 mm. (fully distended, 1.8 mm.). Color nearly uniform blackish brown, with the tube paler in about its apical half and also across extreme base; internal pigmentation abundant, bright red; all legs about concolorous with body, but with fore tarsi and apical fourth of fore tibiae yellow, and tips of middle and hind tibiae, and their tarsi, yellowish brown; antennae with segments I and II blackish brown and about concolorous with head, I paler basally, II paler medially and apically, III yellow in basal fourth or fifth and dark brown beyond, IV-VIII uniform blackish brown.

Head about 1.3 times its greatest width, which is across anterior portion of cheeks, the cheeks slightly convex, curving abruptly to eyes, subparallel for a short distance opposite posterior dorsal margins of eyes, thence tapering to near base, the width across eyes (149 microns) less than the least width (154 microns) near base, the basal collar slightly projecting; vertex obtusely subangulate as seen from above, more nearly vertical than overhanging; dorsal surface of head not at all elevated along median line posteriorly, nearly smooth, lateral surfaces striate, the cheeks serrate in anterior half; postocular setae dark brown, blunt at apex, 50 microns long, 90 apart, and about 15 from nearest facet of eyes; other setae dark brown, minute, pointed. Eyes moderate in size, dorsally about 0.3 as long as head and elliptical in form, ventrally much longer, V-shaped, and produced posteriorly far beyond their posterior dorsal margins, in one caustic-treated paratype (with

head 0.232 mm. long) measuring as follows in microns: dorsal length (parallel with axis of head) 70, maximum width (at right angles to axis of head) 42, least dorsal interval 67, ventral length 77, ventral width 38, least ventral interval (at posterior angles) 74. Ocelli wanting. Antennae stouter than usual, but otherwise normal in structure; segment VI 1.9 times as long as wide, VII 1.8-1.9 times, VIII 2.1-2.3 times; sense-cones long and slender, that on inner surface of III 18-19 microns long, their disposition on inner (and outer) surfaces of segments as follows: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone typical, broadly rounded at tip, moderate in length, extending 83-88 microns beyond posterior dorsal margin of head.

Prothorax normal, along median line of pronotum about 0.5 the length of head and (inclusive of coxae) about 2.3 times as wide as long, its surface smooth; median apodeme wanting; all usual major setae present, dark blackish brown, the epimerals and postero-marginals truncate, but not divided, at tip, all others pointed, the antero-marginals vestigial (9 microns), antero-angulars 19, midlaterals 25, epimerals 44, postero-marginals 40, coxals 24. Mesothorax much narrower than prothorax. Wings wholly wanting.

Abdomen much broader than mesothorax and a little wider than prothorax across coxae, of normal structure; median tergite of segment I much wider (140 microns) than long (62), its hind margin with a pair of pores; tube (segment X, only) about 0.5 as long as head, about twice as long as greatest subbasal width, which is scarcely twice the apical width, its sides straight, its terminal setae brown and 117-120 microns long; all other abdominal setae brown or brownish, those on apical segments much paler, the dorso-lateral series on segments I-VIII truncate, the others pointed, seta I on IX usually dully pointed and 83-88 microns long, II 81-83, III 94-103, intermediate seta (between I and II) 45.

Measurements of female (holotype and a caustic-treated paratype, those of latter in parentheses), in mm.: Length about 1.50 (1.40) (fully distended, 1.78 (1.74)); head, total median length 0.228 (0.232), greatest width (across cheeks) 0.174 (0.175), width across eyes 0.149 (0.151), least width near base 0.154 (0.155), width across basal collar 0.156 (0.157); prothorax, median length of pronotum 0.118 (0.120), greatest width (inclusive of coxae) 0.276 (0.284); mesothorax,

width across anterior angles 0.244 (0.248); abdomen, greatest width (at segment III) 0.287 (0.269); tube (segment X, only), length 0.110 (0.110), greatest subbasal width 0.058 (0.056), least apical width 0.030 (0.032).

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	36	49	54	53	49	47	42	28 (holotype)
	36	49	54	53	49	49	40	27 (paratype)
Width (microns):	36	30	29	29	27	25	22	12 (holotype)
	37	30	30	30	26	25	22	13 (paratype)
Total length of antenna, 0.358 (0.357) mm.								

PERU: Shishmay, Dept. Huanuco (Andes, elevation about 3000 m.), September 16, 1937, Felix Woytkowski, 36 ♀♀, from Puna Grass, «in the puna zone, just below the snow-covered peaks» [Hood No. 1441]; Shishmay, September 15-17, 1937, F. W., 4 ♀♀, «from low shrub thickets» [Hood No. 1444].

One the basis of its habitat and the minute pointed anteromarginal and other prothoracic setae, this species is suggestive only of *bellus*. From that species, which is doubtless its closest relative and the only one with it could possibly be confused, it differs strikingly in the nearly uniform brown coloration and the differently arranged sensecones on the antennae.

## 72. *Adraneothrips oculatus*, sp. nov.

Female (macropterous). — Length about 1.5 mm. (fully distended, 1.8 mm.). Color nearly uniform blackish brown, with the head perceptibly darker and the tube paler in about apical half and also across extreme base; internal pigmentation bright red; all femora concolorous with body, all tibiae much lighter, brownish yellow at either end and dark brown between, the fore pair somewhat more yellowish, all tarsi bright yellow; antennae with segments I and II dark brown and about concolorous with head, I paler basally, II paler medially and apically, III yellow in basal two-thirds and shaded with brown beyond, IV-VIII dark brown or blackish brown, IV slightly than the others because obscurely paler subbasally; fore wings light brown, pale in basal fifth and at extreme tip, with a darker brown median streak in second and third fifths.

Head long, its total length 1.5 times its greatest width, which is at about middle of cheeks, these evenly arcuate to eyes and to near base, the width across eyes (139 microns) much less than the least width near base, the basal collar



very slightly projecting; vertex rounded, subconical, slightly overhanging, and bearing the median ocellus at its extremity; dorsal surface of head decidedly elevated along median line posteriorly, nearly smooth, lateral surfaces lightly striate, the cheeks thus faintly serrate; postocular setae brown and dilated apically, 52 microns long, 59 apart, and about 16 from nearest facet of eyes; other setae brown, minute, and pointed. Eyes very small, about 0.26 as long as head, rounded dorsally and ventrally, on lower surface of head smaller and slightly produced posteriorly, but with their posterior ventral margin not attaining their posterior dorsal margin. Ocelli about 13 microns in diameter, the posterior pair 21 microns apart and 15 from median ocellus, the latter with its anterior margin on the line of front margin of eyes. Antennae of normal form and structure, not especially slender, segment VI 2.1 times as long as wide, VII scarcely 2.4, VIII 2.8; sense-cones long and slender, that on inner surface of III about 22 microns long, their disposition on inner (and outer) surfaces of segments as follows: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone typical, broadly rounded at tip, moderate in length, extending about 108 microns beyond posterior dorsal margin of head.

Prothorax very short, along median line of pronotum only 0.4 the length of head and (inclusive of coxae) about 2.8 times as wide as long, its surface smooth save for a few transverse striae along posterior margin and two or three in front of postero-marginal setae; median apodeme short, black; all usual major setae present, brown, rather broadly dilated at apex, their lengths in microns as follows: antero-marginals 34, antero-angulars about 33, midlaterals about 34, epimerals 52, postero-marginals 44, coxals 28. Mesothorax much narrower than prothorax. Fore wings about 0.70 mm. long, broadest (58 microns) just beyond the third subbasal seta, narrowest (40 microns) just beyond middle, and slightly broadened (47 microns) near apex, with three accessory setae and with the subbasal setae pale yellowish, dilated at apex, and respectively 33, 43, and 50 microns long.

Abdomen somewhat wider than mesothorax and about equal in width to prothorax across coxae, of normal structure; median tergite of segment I longer (73 microns) than wide (56), its hind margin without pores; tube (segment X, only) a trifle less than half as long as head, somewhat more than

twice as long as greatest subbasal width, which is about twice the apical width, its sides straight, its terminal setae brown and 106 microns long; other abdominal setae pale yellowish, those on the basal segments brown at base, all dilated, or at least blunt, apically, with the exception of the lateral pair on VII and seta III on IX (which is about 114 microns long), seta I on IX 83 microns, II 73, intermediate seta (between I and II) 48.

Measurements of female (holotype), in mm.: Length about 1.48 (fully distended, 1.77); head, total median length 0.242, width across eyes 0.139, greatest width across cheeks 0.161, least width near base 0.149, width across basal collar 0.150; prothorax, median length of pronotum 0.096, greatest width (inclusive of coxae) 0.269; mesothorax, width across anterior angles 0.252; abdomen, greatest width (at segment IV) 0.260; tube (segment X, only), length 0.118, greatest subbasal width 0.056, least apical width 0.027.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	31	47	54	55	49	46	47	31
Width (microns):	31	26	28	26	24	22	20	11
Total length of antenna, 0.360 mm.								

PERU: Piedras Grandes, Dept. Huanuco (Andes, elevation about 3000 m.), November 13-17, 1937, Felix Woytkowski, 1 ♀, «from a bush» [Hood No. 1475].

This long-headed, small-eyed species is evidently allied to *stenocephalus* and *cinctiventris*, but differs conspicuously from both in the uniform dark blackish brown body and in the arrangement of the sense-cones.

### 73. *Adraneothrips cinctiventris*, sp. nov.

Female (macropterous). — Length about 1.4 mm. (fully distended, 1.7 mm.). Head, thorax, and abdominal segments IV and VII-X dark brown or blackish brown, the head and last four abdominal segments darkest, II, III, and VI yellow, not darker at sides, II with anterior edge narrowly gray, V brown at base (especially laterally), its remainder and all of VI darker yellow than II and III; all coxae brown, all femora, tibiae, and tarsi clear bright pale yellow and unshaded; antennae with segments I and II dark brown and about concolorous with head, I paler basally, II paler medially and apically, III pale gray, darker apically, IV-VIII gray-brown,

IV slightly lighter than the others and obscurely paler sub-basally; fore wings very light brownish, nearly colorless at tip, and with a faint brown median streak before middle.

Head unusually long, its total median length 1.66 times its greatest width, which is at about middle of cheeks, these evenly arcuate to eyes and to near base, the width across eyes (133 microns) equal to the width at base, the basal collar scarcely projecting; vertex rounded, subconical, slightly overhanging, and bearing the median ocellus at its extremity; dorsal surface of head somewhat elevated along median line posteriorly, nearly smooth, lateral surfaces lightly striate, the cheeks thus faintly serrate; postocular setae pale brown and dilated apically, 46 microns long, 80 apart, and about 25 from nearest facet of eyes; other setae pale, minute, and pointed. Eyes very small, about 0.25 as long as head, rounded dorsally and ventrally, on lower surface of head smaller and not produced posteriorly. Ocelli about 13 microns in diameter, the posterior pair 23 microns apart and 18 from median ocellus, the latter with its anterior margin on the line of front margin of eyes. Antennae of normal form and structure, very slender, segment VI 2.6 times as long as wide, VII nearly 3 times, VIII 3.7 times; sense-cones long and slender, that on inner surface of III about 27 microns long, their disposition on inner (and outer) surfaces of segments as follows: III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone typical, broadly rounded at tip, moderate in length, extending about 84 microns beyond posterior dorsal margin of head.

Prothorax very short, along median line of pronotum only 0.39 the length of head and (inclusive of coxae) about 2.7 times as wide as long, its surface smooth save for a few transverse striae along posterior margin and two or three in front of postero-marginal setae; median apodeme short, black; all usual major setae present, brown, rather broadly dilated at apex, their lengths in microns as follows: antero-marginals 34, antero-angulars about 34, midlaterals about 30, epimerals 46, postero-marginals 38, coxals 27. Mesothorax much narrower than prothorax. Fore wings about 0.56 mm. long, broadest (64 microns) just beyond the third subbasal seta, narrowest (39 microns) just beyond middle, and slightly broadened (50 microns) near apex, with three accessory setae

and with the subbasal setae pale yellowish, dilated at apex, and respectively 34, 44, and 52 microns long.

Abdomen distinctly wider than mesothorax and about equal in width to prothorax across coxae, of normal structure; median tergite of segment I longer (68 microns) than wide (55), its hind margin without pores; tube (segment X, only) about 0.46 as long as head, about twice as long as greatest subbasal width, which is about twice the apical width, its sides straight, its terminal setae brown and 110 microns long; all other abdominal setae pale yellowish, all dilated apically, with the exception of the lateral pair on VII and seta III on IX (which is about 108 microns long), seta I on IX 90 microns, II 101, intermediate seta (between I and II) 65.

Measurements of female (holotype), in mm.: Length about 1.36 (fully distended, 1.68); head, total median length 0.244, greatest width (across cheeks) 0.147; prothorax, median length of pronotum 0.094, greatest width (inclusive of coxae) 0.255; mesothorax, width across anterior angles 0.224; abdomen, greatest width (at segment IV) 0.251; tube (segment X, only), length 0.113, greatest subbasal width 0.058, least apical width 0.028.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	32	45	53	57	57	53	53	37
Width (microns):	34	26	27	24	22	20	18	10
Total length of antenna, 0.387 mm.								

FLORIDA: Homestead, April 2, 1938, Professor J. Chester Bradley, 1 ♀, from «flowers and foliage of *Metopium toxiferum*; some from Long-leaved Pine».

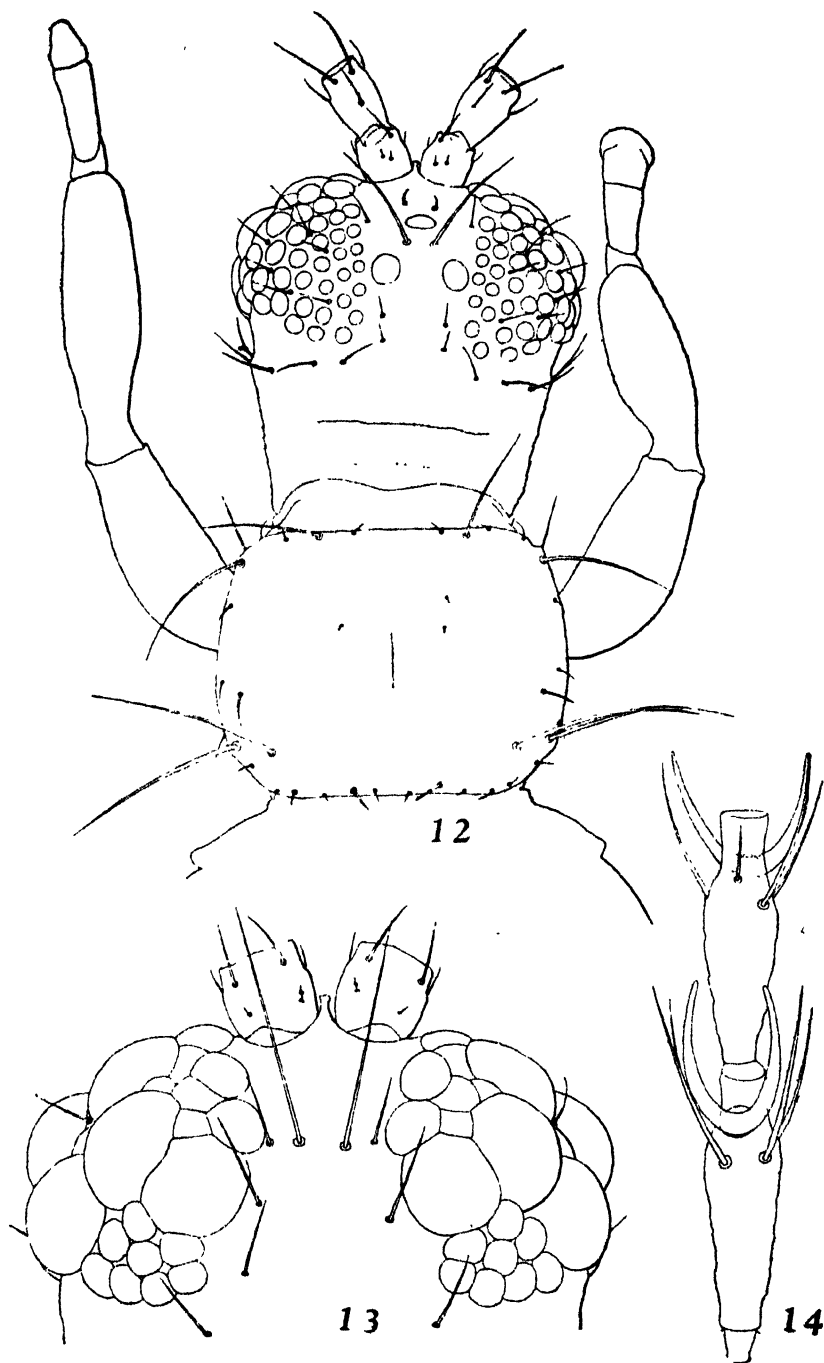
The long head suggests *stenocephalus*, but the unusual coloration of the abdomen and legs, and the more slender antennae, should permit their ready separation.

74. *Exophthalmothrips moultoni*, sp. nov.  
(Figs. 12-14)

Female (macropterous). — Length about 1.9 mm. (fully distended, 2.2 mm.). Color blackish brown, nearly or quite black in head, the thorax paler and with much bright red internal pigmentation; femora blackish brown, concolorous with body, the middle and hind pairs narrowly pale yellow at base, fore tibiae yellow, with only a faint brown cloud across middle portion, middle and hind tibiae concolorous with femora,

except for both ends, which are paler or even yellow, all tarsi pale yellow; fore wings brown, veins darker, nearly colorless in basal fourth, except for extreme base; antennae dark brown and about concolorous with prothorax in segments I and II, the latter segment paler apically, III-V clear pale yellow, concolorous with tarsi, III lightly infuscate subapically in the region of the large setae, IV and V gray-brown in distal half, V also with a gray ring around extreme base, VI-VIII gray-brown, VI with a narrow subbasal brownish yellow ring; all major setae on body and wings blackish brown; ocellar pigmentation dark red.

Head (Fig. 12), when horizontal, as long as the greatest width across cheeks and 0.92 as long as greatest width across eyes, its broad basal apodeme black; cheeks broadest at extreme anterior end and converging strongly and straightly to base, except for a prominent setigerous swelling behind eyes, the least basal width less than 0.7 that across eyes; dorsum of head cross-striate with anastomosing lines in basal third or fourth, only, where they produce a faint serration in the cheeks; interocellar setae arising well within the ocellar triangle about midway between the anterior ocellus and the posterior ones, their length about 79 microns, their interval 16; post-oculars dark and distinct, two pairs (one behind the other) between the eyes behind the posterior ocelli; dorsum of head with a pair of minor setae directly in front of median ocellus, their interval about equal to diameter of latter, and with a second pair of setae (about 33 microns long) about opposite middle of median ocellus. Eyes (Figs. 12 and 13) strongly protruding and extremely prominent, about 0.5 the total length of head, invariably with five greatly enlarged ventro-lateral facets whose diameter is about 40 microns, three of these and a smaller anterior one forming the lateral and anterior outline of eyes as seen in dorsal aspect; eyes of one caustic-treated topotypic paratype (with head 216 microns long and 232 across eyes) measuring as follows in microns: dorsal length 107, dorsal width 82, least dorsal interval (posteriorly) 69, ventral length 109, ventral width 93, least ventral interval (posteriorly) 46, these measurements being to the edges of the contained facets. Ocelli 20 microns in diameter, the posterior pair 29 apart and 24 from median ocellus. Antennae slender, somewhat more than twice the length of head; segment III (Fig. 14) about 90 microns long and 3.6 times as



*Exophthalmothrips moultoni*, sp. nov.

Fig. 12. Head and prothorax, female, paratype; dorsal aspect. — Fig. 13. Anterior part of head, female, paratype; ventral aspect. — Fig. 14. Segments III and IV, left antenna, female, holotype.

long as wide; forked sense-cones on III and IV long, that on III with axis about 48 microns; dorsal pair of setae on II blackish brown, 47 microns long in holotype. Mouth-cone extending about 153 microns beyond posterior dorsal margin of head or 115 microns beyond base of labrum (in the caustic-treated paratype referred to earlier in this description).

**Prothorax** (Fig. 12) about 0.75 as long as width of head across eyes and about 1.3 times as wide as long, with a few indistinct lines of sculpture near posterior margin, only; major setae long and prominent, measuring as follows in microns (in the topotypic paratype previously mentioned): antero-marginals 76, antero-angulars 94, outer pair at posterior angles 128, inner 125; posterior margin always with five pairs of small setae mediad of the inner pair at posterior angles, the second and fourth pairs somewhat longer and stronger than the others. Fore wings about 1.31 mm. long, holotype with 29-30 setae on anterior margin (those at middle about 117 microns long), anterior vein with one minute seta near base followed by three successively longer ones and then by 20-21, posterior vein with 17-18.

**Abdomen** of normal form and structure; tergum VIII with comb on posterior margin complete and even, the longest individual microtrichia about 19 microns, IX of holotype with seta I 128 microns, II 175, III 216; X with setae I and II equal, each 221 microns long.

**Measurements of female**<sup>10</sup> (holotype), in mm.: Length about 1.85 (fully distended, 2.22); head, total length 0.210, width across eyes 0.228, greatest width across cheeks 0.207, least width near base 0.157; prothorax, median length of pronotum 0.171, greatest width 0.227; pterothorax, greatest width 0.351, width across anterior angles 0.272; abdomen, greatest width (at segment IV) 0.318.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	55	90	77	60	72	15	24
Width (microns):	33	32	25	24	21	22	10	7
Total length of antenna, 0.430 mm.								

**Male** (macropterous). — Smaller, slenderer, and paler than female, but otherwise very similar; abdominal sterna

<sup>10</sup>) Like most, if not all species of Thysanoptera, both sexes are highly variable in size. As nearly as may be determined, the holotype represents about the average of the species.

III-VII each with a large, median, transverse, subelliptical, glandular area, allotype with that on II  $86 \times 34$  microns, that on VII  $69 \times 33$ , these areas somewhat narrowed medially; tergum IX with three pairs of central setae, the median pair (30 microns long and 12 apart) equal in length and width to the lateral pair (80 apart), which arise about 11 microns anteriorly, the third pair very much smaller and paler, about 40 microns apart and situated a short distance (5-7 microns) behind the median pair, the pores with their centers about 42 microns apart and situated on a line connecting the bases of the second pair of setae; segment X with its two pairs of long (133 microns) curved setae quite stout (6 microns in diameter near base), blackish brown and concolorous with three straighter pairs on sides of IX (the uppermost of these 153 microns long, the anterior pair 113).

Measurements of male (allotype and a topotypic, caustic-treated paratype whose head is 0.168 mm. long and 0.169 mm. across eyes, the measurements of the latter specimen given in parentheses), in mm.: Length about 1.37 (distended, 1.55); head, total length 0.186, width across eyes 0.188, greatest width across cheeks 0.175, least width near base 0.134; eyes, dorsal length (0.082), dorsal width (0.056), dorsal interval (0.056), ventral length (0.079), ventral width (0.064), ventral interval (0.040); ocelli, diameter (0.015-0.016), interval between posterior pair (0.027), distance between anterior and posterior (0.020); interocellar setae, length (0.060), interval (0.012); mouth-cone, length beyond posterior dorsal margin of head (0.112); prothorax, median length of pronotum (0.139), greatest width (0.185), antero-marginal setae 0.073, antero-angulars 0.088, outer pair at posterior angles 0.087, inner pair 0.091; pterothorax, greatest width 0.284, width across anterior angles 0.234; fore wings, length 1.04, width at middle 0.070, length of middle costal setae 0.083; abdomen, greatest width (at segment IV) 0.238.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	28	45	79	68	57	65	14	22
Width (microns):	31	28	21	20	19	20	9	6
Total length of antenna, 0.378 mm.								

PERU: Almirante, Dept. Amazonas, December 21, 1936, Felix Woytkowski, 19 ♀♀ and 17 ♂♂ (including holotype), from flowers of *Fuchsia decussata* R. & P. (determined



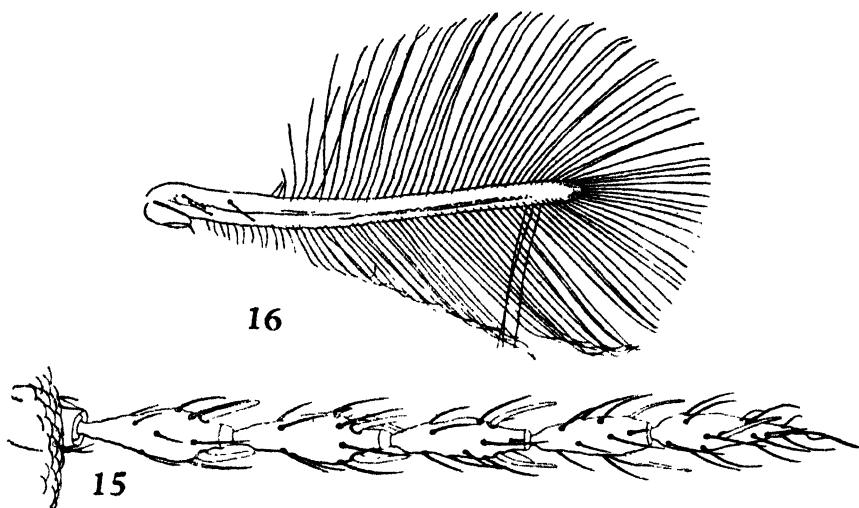
by Dr. Paul C. Standley) [Hood No. 1171]; Shishmay (about 20 km. east of Huanuco, in the Andes, elevation about 3000 m.), Dept. Huanuco, September 15-21, 1937, F. W., 2 ♀♀, from an unidentified shrub [Hood No. 1448].

Separated from *longipennis*, which I know only from its description and figure, by a number of characters mentioned in the above description, of which the following would seem to be the most important: (1) Head opaque black, or nearly so, much darker than the rest of the body, and strongly narrowed posteriorly; (2) antero-lateral outline of eyes formed by four facets, only; (3) second antennal segment nearly twice as long (55 microns in comparison with 30), and with the dorsal setae at its apex more than 0.8 the length of the segment itself; and (4) prothorax much narrower and more rounded, not broadened posteriorly, and with five pairs of small setae, instead of four, on the posterior margin mediad of the major setae at posterior angles.

75. *Macrophthalthrips exilicornis*, sp. nov.  
(Figs. 15 and 16)

Female (macropterous). — Length about 1.9 mm. (fully distended, about 2.4 mm.). Color brown, with intermingled red and opaque-white internal pigmentation: By reflected light, in freshly-mounted specimens which have not remained long in preservative, with a prominent white latero-dorsal stripe extending from the eyes to base of head and margining the sides of prothorax, where it is widened posteriorly; pterothorax with a lateral longitudinal white vitta in about anterior two-thirds, beneath the wings, a pair of small white spots near anterior angles of mesothorax, a pair of larger white spots at sides of metanotum behind the middle, and a narrow band of white across mesonotum; abdomen with a pair of nearly round dorso-lateral white spots on terga I, III, and V, those on III largest; red pigmentation prominent in thorax and abdomen, including tube; eyes bright red. By transmitted light and in specimens which have remained for some time in preservative, these white markings are not evident as such, but the nearly transparent areas of the cuticula through which the white pigmentation may normally be seen may show as pale yellowish markings, the sides of the head and prothorax then largely yellow; general color of body brown, usually darkest in head and in metathoracic epimera and episterna, palest (often nearly yellow) in abdominal segments V-VII or VI-VII; all coxae brown or blackish brown; all tarsi bright pale yellow; fore femora largely yellow (especially apically)

and irregularly clouded with brown; middle and hind femora much darker, largely brown or blackish brown, usually yellow at either end, sometimes with a more or less detached blackish brown area at apical third of ventral surface; fore tibiae yellow, with an incomplete brown ring around middle, formed by the partial union of three brown spots; middle and hind tibiae largely dark brown or blackish brown, broadly yellow



*Macrophthalmothrips exilicorvus*, sp. nov.  
Fig. 15. Left antenna, female, holotype — Fig. 16. Right fore wing, female holotype.

at tip and more narrowly so at base; fore wings brown, paler in outer part of scale and in anterior half to the third sub-basal seta, with the usual dark brown median «vein» interrupted for a short distance beyond basal third of wing; antennae with segment II yellow, with a dark brown cloud occupying outer portion of apical half, III pale yellow in basal three-fifths and clouded with brown beyond, especially on outer surface, IV and V with basal two-fifths, and VI with basal one-third, pale yellow, the remainder of antennae dark brown or blackish brown.

Head about 1.54 times as long as greatest width (which is behind middle of cheeks) and about 1.75 times as long as width across eyes, the cheeks very minutely serrulate (especially anteriorly), gently converging to base and more distinctly toward eyes, their extreme anterior portion abruptly rounded to eyes beneath the lateral margins of latter; vertex typical,

greatly produced and overhanging, bearing the wholly obscured median ocellus below its apex, with about four pairs of strong brown medially-curved setae at sides in front of posterior ocelli and a less-curved slenderer pair behind the ocelli, its rounded anterior portion with a number of raised longitudinal darker lines of sculpture, the portion behind the posterior ocelli subreticulate; dorsal surface of head, in the dark median area (which anteriorly is about equal in width to the distance across eyes, but which is narrower posteriorly), with transverse anastomosing lines of sculpture whose reticles are nowhere occupied by minute wrinkles, the pale vitta on each side of head free of sculpture; postocular setae nearly colorless, 38 microns long in holotype, 59 microns apart, and 20 from eyes, their tips very slightly expanded and truncate, a minute pointed pair of setae between them equal to about a dozen pairs in the darkened area and to several very inconspicuous glass-clear ones in the pale vittae and on profile of cheeks; a few minute setae between eyes. Eyes normal to the genus, i.e., very large, finely faceted, nearly touching dorsally, and completely touching beneath vertex, nearly reniform as seen from above, in holotype 172 microns long dorsally, 90 in maximum width, their greatest interval 49, least interval probably about 2. Ocelli normal to the genus. Antennae (Fig. 15) very slender for the genus, with all of segment I and more than half of II covered by the eyes; segments III-V vasiform, distinctly constricted apically; VII and VIII almost completely fused on dorsal surface, though with a separating suture ventrally; III 2.8 times as long as wide, IV 3 times, V 3.3, VI 3.2, VII+VIII 3.9; sense-cones large, moderately stout, rounded at tip, disposed as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone especially long and slender, in non-distended specimens with the tips of labial palpi about attaining metasternum, its extent beyond posterior dorsal margin of head about 350 microns (thus distinctly longer than dorsum of head); segment II of maxillary palpi about 63 microns long.

Prothorax approximately 2.5 times as wide across coxae as median length of pronotum, the last about 0.4 as long as head, with a deep, transverse, nearly black, apodermal furrow across middle, in front of which are two pairs of round foveae, one directly in front of the other, at the inner margin of

the white vitta; central dark area nearly quadrangular, very closely transversely striate with fine dark line which are equally spaced (about 1.5 microns apart) in front of and behind the transverse furrow, the interspaces completely devoid of sculpture; white vittae striate, rather than subreticulate; epimeron, episternum, and notum of prothorax all fused, no separating sutures visible; all usual major setae present, all pale yellowish, dilated and divided at tip, the antero-marginals of holotype 51 microns, antero-angulars 51, midlaterals 40, epimerals 76, postero-marginals 66, coxals 33. Pterothorax normal; mesonotum transversely striate about as closely, but not so heavily, as pronotum, the lines pale in the area of the white transverse marking, the more lateral reticles in the dark area with faint stipple-like dark dots; metanotum predominantly longitudinally striate, the more medial striae in basal portion dash-like and disconnected, the apical fourth of median area lightly polygonally reticulate, most of the reticles (including the more basal of the polygonal ones) with stipple-like dots or granulations. Legs normal. Fore wings (Fig. 16) normal in form, about 0.8 mm. long in holotype, 57 microns wide just beyond the third subbasal seta, about 45 wide at the narrowest point near middle, and 50 wide near apex, with 3-5 accessory setae and with the pale brownish-yellow subbasal setae dilated and divided at tip, I 46 microns long, II 50, III 59.

Abdomen normal in form, long and slender; terga II-VI with the usual patch of microtrichia laterad of the wing-retaining setae, VII almost bare at this point; tube about 0.36 as long as head, about 1.9 times as long as greatest subbasal width, which is scarcely twice the apical width, its sides straight; major abdominal setae mostly dilated at apex, the lateral pairs on II-VII and IX brown, the others (including the terminal ones) nearly colorless; seta I on IX dilated and about 100 microns long, II and III pointed and about 100 and 89 microns long, respectively; terminal setae 113 microns.

Measurements of female (holotype), in mm.: Length about 1.9 (fully distended, 2.35); head, total length 0.319, width across eyes 0.182, greatest width across cheeks 0.207, least width near base 0.200, width across basal collar 0.204; prothorax, median length of pronotum 0.128, greatest width (across coxae) approximately 0.329; mesothorax, width across anterior angles 0.305; abdomen, greatest width (at segment

III) 0.316; tube (segment X, only), length 0.114, greatest subbasal width 0.061, least apical width 0.033.

Antennal segments:	1	2	3	4	5	6	7+8
Length (microns):	-	-	84	87	76	70	81
Width (microns):	-	-	30	29	23	22	21
Total length of antenna, approximately 0.490 mm.							

Male (macropterous). — Color and structure (including sculpture) almost as in female, though somewhat paler (especially the legs) and slenderer.

Measurements of male (allotype), in mm.: Length about 1.44 (fully distended, 1.71); head, total length 0.258, width across eyes 0.172, greatest width across cheeks 0.189, least width near base 0.178, width across basal collar 0.182; eyes, dorsal length 0.146, maximum dorsal width 0.085, greatest dorsal interval approximately 0.037, least dorsal interval approximately 0.002; postocular setae, length 0.033, interval 0.047, distance from eyes 0.017; mouth-cone, length beyond posterior dorsal margin of head (to tips of labial palpi) 0.273; segment II of maxillary palpi 0.045; prothorax, median length of pronotum 0.132, greatest width (inclusive of coxae) 0.252, antero-marginal setae 0.033, antero-angulars 0.036, mid'aterals 0.030, epimerals 0.058, postero-marginals 0.050, coxals 0.033; mesothorax, width across anterior angles 0.256; fore wings, length 0.57; abdomen, greatest width (at segment II) 0.220; tube (segment X, only), length 0.096, greatest subbasal width 0.053, least apical width 0.031, terminal setae 0.087; seta I on segment IX of abdomen 0.097, II 0.119, III 0.120.

Antennal segments:	1	2	3	4	5	6	7+8
Length (microns):	-	-	67	73	65	61	75
Width (microns):	-	-	22	22	19	20	19
Total length of antenna, approximately 0.425 mm.							

TRINIDAD: April 2, 1915, Dr. C. B. Williams, 1 ♀ (holotype), «on trunk of tree fallen across river» [Williams No. 645]; March, 1915, F. W. Urich, 2 ♂♂ (including allotype), «in tree stump» [Williams No. 603]; Woodlands, near Guia co, February 16, 1918, C. B. W., 2 ♀♀, «from branches» [Williams No. 1039]; Caura Valley, January 11, 1917, F. W. U., 3 ♀♀, «on trunk of diseased breadfruit» [Williams No. 902].

That this species is different from the Paraguayan *hemipteroides* can hardly be doubted, for by no stretch of the imagination could one

consider the antennae eight-segmented, nor is it likely that the apical constriction of the third to fifth antennal segments would fail to attract Priesner's attention and be described by him. Furthermore, the antennae are evidently much more slender than in his species, for he gives the length of segment V as only 68 microns and VI as only 57. Though his figure of the head and one antenna shows these parts in dorso-lateral aspect and makes impossible direct accurate comparison of his figure of the antenna with mine, he described the species from «einige ♀♀», gives measurements of the width of the head, prothorax, mesothorax, abdomen, and antennal segments, and thus doubtless studied specimens which were mounted with the dorsal side uppermost. Therefore his measurements of the antennal segments must be accepted at their face value.

76. *Macrophthalthrips femoralis*, sp. nov.

Female (macropterous). — Length about 1.8 mm. (fully distended, about 2.3 mm.). Color brown, with intermingled red and opaque-white internal pigmentation: By reflected light, in freshly-mounted specimens which have not remained long in preservative, with a prominent white latero-dorsal stripe extending from the eyes to base of head and margining the sides of prothorax, where it is widened posteriorly; mesothorax with a lateral longitudinal white vitta beneath the wings, a pair of small white spots in the lateral angles of the mesonotum, and a broad white transverse band occupying most of remainder of mesonotum; metathorax with a pair of longitudinal dashes on its dorsal surface, one of them on each side of the metanotal plate, these dashes broadened posteriorly and half the length of the plate itself; abdomen with a pair of nearly round dorso-lateral white spots on terga I, III, and V, those on III largest; red pigmentation prominent in thorax and abdomen, including tube; eyes bright red. By transmitted light, and doubtless also in specimens which have remained for some time in preservative, these white markings are not evident as such, but the nearly transparent areas of the cuticula through which the white pigmentation may normally be seen show as pale yellowish markings, the sides of the head and prothorax then largely yellow; general color of body dark blackish brown, darkest in head, along sides of prothorax, and in the last few abdominal segments, none of the abdominal segments paler; all coxae and femora uniform dark blackish brown; fore tibiae bright yellow in apical third, the remainder brown and dappled with yellow; middle and hind tibiae bright yellow in apical third, the remainder of

middle pair wholly blackish brown, the hind pair yellowish at base and mostly blackish brown in the middle portion; all tarsi yellow at base and brown beyond; fore wings brown, marginally darker, paler between the second subbasal seta and the costal dilation beyond the third seta, and with the usual dark brown median «vein» not interrupted beyond basal third of wing; antennae with segment II brownish yellow, shaded with dark brown at base and along inner surface, III pale yellow in basal three-fifths and across apex, the intervening portion and a small indistinct area on inner surface at basal third, brown, IV and V with basal third, and VI with basal two-thirds, yellow, shaded lightly with brown or gray at extreme base, the remainder of antennae blackish brown.

Head about 1.4 times as long as greatest width (which is behind middle of cheeks) and about 1.77 times as long as width across eyes, the cheeks very minutely serrulate, gently converging to base and more distinctly toward eyes, their extreme anterior portion abruptly rounded to eyes beneath the lateral margins of latter; vertex typical, greatly produced and overhanging, bearing the partially obscured median ocellus only slightly below its apex, seemingly with only one pair of long (20 microns) strong brown medially-curved setae at sides in front of posterior ocelli and a less-curved slenderer pair behind the ocelli, its rounded anterior portion with a number of raised longitudinal darker lines of sculpture; dorsal surface of head, in the dark median area (which is about equal in width to the distance across eyes but which is scarcely narrowed posteriorly), with indistinct transverse anastomosing lines of sculpture whose reticles are nowhere occupied by minute wrinkles, the pale vitta on each side of head apparently free of sculpture; postocular setae dark brown, 17 microns long in holotype, 53 microns apart, and 22 from eyes, their tips nearly pointed, a minute pair of setae between them equal to several others in the darkened area and to several very inconspicuous glass-clear ones in the pale vittae and on profile of cheeks; a few minute setae between eyes. Eyes normal to the genus, i. e., very large, finely faceted, nearly touching dorsally and completely touching beneath vertex, nearly reniform as seen from above, in holotype 146 microns long dorsally, 74 in maximum width, their greatest interval 37, least ventral interval probably about 6. Ocelli normal to the genus. Antennae

normal, though stouter than is perhaps usual; all of segment I and nearly half of II covered by the eyes; segments III-V not at all vasiform, not constricted apically; VII and VIII almost completely fused on dorsal surface, though with a separating suture ventrally; III fully 2.8 times as long as wide, IV nearly 2.4 times, V 2.2, VI 2.3, VII+VIII 2.7; sense-cones moderately large and stout, those on III and IV tapering only slightly, rounded at tip, disposed as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone much shorter than usual, in non-distended specimens with the tips of labial palpi only slightly, if at all, surpassing front margin of mesosternum, its extent beyond posterior dorsal margin of head only 231 microns (thus much shorter than dorsum of head); segment II of maxillary palpi about 52 microns long.

Prothorax scarcely 2.3 times as wide across coxae as median length of pronotum, the last about 0.5 as long as head, with a deep, transverse, nearly black, apodemal furrow across middle; central dark area nearly quadrangular, rather closely transversely striate with fine, dark, equally-spaced lines (nearly 3 microns apart) which are somewhat less distinct in front of the transverse furrow, their interspaces completely devoid of sculpture; epimeron, episternum, and notum of prothorax all fused, no separating sutures visible; all usual major setae present, the antero-marginals, postero-marginals, and coxals dark brown, the others (which arise in the pale areas of prothorax) pale yellowish, all of these setae dilated and divided at tip, the antero-marginals 38 microns, antero-angulars 26, midlaterals 24, epimerals 56, postero-marginals 44, coxals 20. Pterothorax normal; metanotum longitudinally striate, the median striae in basal portion not dashlike or disconnected, the extreme tip, only, of median sculptured area lightly polygonally reticulate, all of the reticles (excepting the few apical polygonal ones) with a single median extremely fine stria dividing it into two equal parts. Legs normal. Fore wings normal in form, except for the enlargement of the usual lobe-like expansion of the costal margin just beyond the third sub-basal seta; length of wing about 0.83 mm., greatest width just beyond the third subbasal seta 72 microns, least width near middle 45, and greatest width near apex 60; 6 accessory setae; subbasal setae yellowish brown, dilated and divided at tip, I 39 microns long, II 39, III 50.



Abdomen normal in form, long and slender; terga II-IV with the usual patch of microtrichia laterad of the wing-retaining setae, but with the microtrichia themselves short and few, almost completely absent from tergum V and the succeeding ones; tube about half as long as head, about twice as long as greatest subbasal width, which is scarcely twice the apical width, its sides straight; major abdominal setae mostly dilated at apex, the lateral pairs on II-VII and IX, and the terminal ones, brown, the others much paler; seta I on IX dilated and about 93 microns long, II and III pointed and about 120 and 80 microns long, respectively; terminal setae 126 microns.

Measurements of female (holotype), in mm.: Length about 1.79 (fully distended, 2.26); head, total length 0.272, width across eyes 0.153, greatest width across cheeks 0.195, least width near base 0.192, width across basal collar 0.193; prothorax, median length of pronotum 0.135, greatest width (across coxae) 0.307; mesothorax, width across anterior angles 0.294; abdomen, greatest width (at segment III) 0.314; tube (segment X, only), length 0.133, greatest subbasal width 0.065, least apical width 0.035.

Antennal segments:	1	2	3	4	5	6	7 + 8
Length (microns):	—	—	77	73	60	59	65
Width (microns):	—	35	27	31	27	26	24

Male (macropterous). — Color and structure (including sculpture) almost as in female, though the specimen on the whole is somewhat paler and slenderer; fore tibiae of allotype merely a narrow brown ring around middle, with bases of middle tibiae brownish yellow and thus much paler than the middle portion, and with bases of hind tibiae bright yellow.

Measurements of male (allotype), in mm.: Length about 1.55 (fully distended, 1.84); head, total length 0.245, width across eyes 0.134, greatest width across cheeks 0.157, least width near base 0.149, width across basal collar 0.152; eyes, dorsal length 0.130, maximum dorsal width 0.065, greatest dorsal interval (approximately) 0.033, least dorsal interval (approximately) 0.003; postocular setae, length 0.017, interval 0.050, distance from eyes 0.024; mouth-cone, length beyond posterior dorsal margin of head (to tips of labial palpi) 0.185; segment II of maxillary palpi 0.042; prothorax, median length

of pronotum 0.113, greatest width (inclusive of coxae) approximately 0.241, antero-marginal setae 0.024, antero-angulars 0.020, epimerals 0.047, postero-marginals 0.044; mesothorax, width across anterior angles 0.241; fore wings, length 0.72; abdomen, greatest width (at segment II) 0.234; tube (segment X, only), length 0.121, greatest subbasal width 0.060, least apical width 0.032, terminal setae 0.096; seta I on segment IX of abdomen 0.087, II 0.111, III 0.103.

Antennal segments:	1	2	3	4	5	6	7 + 8
Length (microns):	—	47	72	68	59	55	67
Width (microns):	—	31	25	27	24	24	22

PERU: vicinity of Celendin, Dept. Cajamarca, June 1-3, 1936, Felix Woytkowski, 1 ♀ and 1 ♂, from «bush, often containing dry branches with moss» [Hood No. 1187].

The blackish brown fore femora distinguish this species from all others of its genus in the New World.

#### 77. *Adelothrips sculptilis*, sp. nov.

Female (macropterous). — Length about 4.8 mm. (nearly fully distended, 5.7 mm.). Color nearly uniform dark blackish brown, the tube dark brown, blackish at sides and with its constricted tip abruptly blackish; legs about concolorous with body, fore tarsi deep yellow, slightly shaded with brown, middle and hind tarsi, and the tips of their tibiae, dark brown; antennae with segments I, VII, and VIII about concolorous with head, II paler than I, especially in the broadened basal seventh and in apical half, fading to yellow subapically, III bright yellow, lightly infusate apically, IV-VI golden yellow, pedicels darkened successively more heavily and extensively with blackish brown, apical third, half, and three-fifths, respectively, dappled with blackish brown; fore wings dark brown in scale and to about the second subbasal seta, light brown beyond, though much paler in about second seventh, marginally, and at tip; internal pigmentation carmine-red.

Head nearly 1.4 times as long as greatest width, which is across cheeks at about their anterior third, the width across eyes much less; cheeks with their extreme anterior part curving abruptly to eyes, anterior third nearly parallel, posterior part roundly converging to near basal collar, the least width near base less than that across eyes, the width across basal collar

greater than the width across eyes; median dorsal area of head not noticeably arched or elevated; vertex flat, not at all overhanging; dorsal and lateral surfaces of head heavily subreticulate, except medially; postocular setae dark brown, curved, long (249 microns), and pointed, 319 microns apart and 87 from eyes; all other cephalic setae dark brown and pointed, those on sides of cheeks short (22 microns), the postocellars 32 microns long and 84 apart, the occipital pair 34 long, 101 apart, and arising 32 behind postoculars. Eyes directed more forward than laterally, roughly subquadrangular in dorsal aspect, about one-fourth the length of head and with a few enlarged facets protruding at outer posterior angles, their dorsal length 150 microns, dorsal width 110, dorsal interval 172, ventral length 111, ventral width 105, ventral interval 182 — all of these measurements only moderately accurate, because the unique type has not been treated with caustic. Ocelli about 43 microns in diameter and situated close together on a slight elevation, the posterior ones approximately 55 microns apart and 49 from median ocellus, this last directed upward and forward, slightly overhanging, and with its front margin 46 microns behind that of eyes. Antennae eight-segmented, with the last two segments separated by a distinct complete suture, though closely united with each other; sense-cones moderately long and slender (that on inner surface of III 63 microns), disposed as follows on the inner (and outer) surfaces of the segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone large, heavy, broadly rounded at tip, not attaining posterior margin of prosternum, its extent beyond posterior dorsal margin of head about 287 microns; maxillary palpi moderately large and heavy, their second segment 105 microns long.

Prothorax with median line of pronotum about 0.61 that of head and contained in the trans-coxal width 2.25 times, its surface heavily polygonally subreticulate except posterior to the line of the postero-marginal setae; midline with distinct, dark, partial apodeme; all major setae present, all pointed except the coxal, which is rounded at tip, the antero-marginals (34-60 microns) and the antero-angulars (126 microns) dark brown, the others colorless, midlaterals 328, epimerals 330, postero-marginals probably about equal to epimerals, coxals 157. Pterothorax normal, its greatest width

distinctly less than that of prothorax. Legs normal, the fore tarsi with a long (56 microns) strong tooth. Wings present, the fore pair 2.35 mm. long, broadest (224 microns) subapically, 210 microns wide at middle, with about 46 accessory setae, and with the three subbasal setae disposed in a nearly straight line and respectively 112-122, 185-186, and 165-168 microns long.

Abdomen narrower than prothorax and pterothorax, most of the area of the first five or six segments polygonally subreticulate; setae pale yellow, or yellowish at base, long and pointed, the three major pairs on IX respectively 599, 560, and 392 microns long, the terminal ones brown at base and 434 microns long; tube (segment X, only) heavily sclerotized, somewhat longer than head, 3.1 times as long as greatest subbasal width (which is across the basal collar), this width about 2.5 times the least apical width, its sides slightly concave before middle, its tip sharply narrowed.

Measurements of female (holotype), in mm.: Length about 4.79 (nearly fully distended, 5.73); head, total length 0.588, width across eyes 0.392, greatest width across cheeks 0.421, least width near base 0.377, width across basal collar 0.406; prothorax, median length of pronotum 0.358, width (inclusive of coxae) 0.806; pterothorax, width across anterior angles 0.727, greatest width 0.745; abdomen, greatest width (at segment V) 0.738; tube (segment X, only), length 0.612, greatest subbasal width 0.196, least apical width 0.077.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	104	120	216	179	142	114	89	50
Width (microns):	90	60	73	73	63	52	44	26
Total length of antenna, 1.01 mm.								

PERU: Piedras Grandes, Dept. Huanuco (Andes, elevation about 3000 m.), November 13-17, 1937, Felix Woytkowski, 1 ♀, «from a bush» [Hood No. 1475].

The very large size of this species separates it at once from all others of the genus, with the exception of *conicura*, described immediately below. From that species it differs outstandingly in having the tube longer than the head, slender, and sharply narrowed apically, as well as in having the pronotum heavily sculptured.

#### 78. *Adelothrips conicura*, sp. nov.

Female (macropterous). — Length about 4.1 mm. (fully distended, 5.2 mm.). Color nearly uniform chestnut-brown,

abdomen slightly paler in segments V-VIII, the tube slightly darker than body in basal half and deep brown in apical half; all coxae and femora about concolorous with body, middle and hind tibiae fading to yellowish brown at apex, where they are concolorous with their tarsi, fore tibiae yellowish brown in basal third, their remainder deep yellow, narrowly brownish at sides, fore tarsi yellow; antennae with segments I, VII, and VIII about concolorous with head, II paler than I, fading to pale yellow in apical half, III bright yellow, paler basally but not infusate apically, IV deep golden yellow, infusate in apical fourth, V brownish yellow in about middle third, its remainder infusate, VI yellowish brown in basal two-fifths, dark brown beyond; fore wings dark brown in scale, light brown beyond, though paler in about second seventh as well as marginally and at tip; internal pigmentation bright red

Head about 1.4 times as long as greatest width, which is across cheeks a little behind posterior dorsal margin of eyes, the width across eyes much less; cheeks with their extreme anterior part curving distinctly but not abruptly to eyes, the rest roundly converging to near basal collar, the least width near base much less than that across eyes, the width across basal collar slightly more than 0.9 that across eyes; median dorsal area of head arched and elevated; vertex flat, transverse, its anterior surface nearly vertical, very slightly overhanging; dorsal and lateral surfaces of head rather heavily diagonally subreticulate, except medially; post-ocular setae brown, pale apically, curved, long (238 microns), and pointed, 263 microns apart and 82 from eyes; all other cephalic setae brown, with pale pointed tips, those on sides of cheeks about 29 microns long, the postocellars 43-56 long and 56 apart, the occipital pair 40 long, 107 apart, and arising 13-21 behind postoculars. Eyes a little less than one-fourth the length of head and with a few enlarged facets protruding at outer posterior angles, their dorsal length 130 microns, dorsal width 109, dorsal interval 143, ventral length 126 — all of these measurements only moderately accurate, because the unique type has not been treated with caustic. Ocelli about 36 microns in diameter and situated close together, the posterior ones 35 microns apart and 33 from median ocellus; median ocellus directed nearly forward, overhanging, and with its front margin very slightly behind that

of eyes. *Antennae* eight-segmented, with the last two segments separated by a distinct complete suture, though closely united with each other; sense-cones moderately long and slender (that on inner surface of segment III 57 microns), disposed as follows on the inner (and outer) surfaces of the segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VI 1 dorsally. *Mouth-cone* large, heavy, broadly rounded at tip, not attaining posterior margin of prosternum, its extent beyond posterior dorsal margin of head about 336 microns; maxillary palpi moderately large and heavy, their second segment 99 microns long.

*Prothorax* with median line of pronotum 0.6 that of head and contained in the trans-coxal width 2.15 times, its surface without sculpture; midline with distinct dark partial apodeme; all major setae present, all pointed except the coxal and antero-marginal pairs, which are rounded at tip, the antero-marginals (84-93 microns) and the antero-angulars (86 microns) dark brown, the others colorless apically and more or less tinted with brown at base, midlaterals 280, epimerals 277, postero-marginals 322, coxals 154. *Pterothorax* normal, its greatest width distinctly less than that of prothorax. *Legs* normal, the fore tarsi with a long (33 microns) strong tooth. *Wings* present, the fore pair 1.96 mm. long, nearly equal in width (168 microns) throughout, with about 41 accessory setae, and with the three subbasal setae disposed in a nearly straight line, their lengths respectively 121, 160, and 203 microns.

*Abdomen* narrower than prothorax and pterothorax, most of the area of the first seven segments lightly polygonally subreticulate; setae pale yellow or yellowish at base, long and pointed, the three major pairs on IX respectively 406, 392, and 342 microns long, the terminal ones brown at base and 336 microns long; tube (segment X, only) not especially heavily sclerotized, about 0.73 the length of head, only 2.3 times as long as greatest subbasal width (which is across the basal collar), this width about 2.4 times the least apical width, its sides slightly convex basally, straight and evenly converging beyond, its tip not at all narrowed.

*Measurements* of female (holotype), in mm.: Length about 4.12 (fully distended, 5.17): head, total length 0.538, width across eyes 0.361, greatest width across cheeks 0.378, least width near base 0.322, width across basal collar 0.335;

prothorax, median length of pronotum 0.322, width (inclusive of coxae) 0.703; pterothorax, width across anterior angles 0.634, greatest width 0.682; abdomen, greatest width (at segment III) 0.648; tube (segment X, only), length 0.395, greatest subbasal width 0.169, least apical width 0.070.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	98	104	182	161	130	111	94	53
Width (microns):	80	50	57	61	48	42	34	24
Total length of antenna, 0.933 mm.								

Male (macropterous). — Identical with female in color, except that the darkened portions of the wings are a somewhat deeper brown; structure very similar to that of female, though the prothorax and fore legs are somewhat enlarged; fore tarsal tooth somewhat stronger in the allotype, though not longer.

Measurements of male (allotype), in mm.: Length about 4.09 (nearly fully distended, 4.87); head, total length 0.518, width across eyes 0.335, greatest width across cheeks 0.349, least width near base 0.302, width across basal collar 0.319; eyes, dorsal length 0.133, dorsal width 0.096, dorsal interval 0.144, ventral length 0.116; median ocellus, diameter 0.034; posterior ocelli, diameter 0.037, interval 0.030, distance from median ocellus 0.033; postocular setae, length 0.200, interval 0.269, distance from eyes 0.070; postocellar setae, length 0.026, interval 0.059; occipital setae, length 0.052, interval 0.100, distance behind postoculars 0.018-0.029; mouth-cone, length beyond posterior dorsal margin of head 0.301; prothorax, median length of pronotum 0.336, greatest width (inclusive of coxae) 0.700; antero-marginal setae, length 0.090-0.093, antero-angulars 0.050, midlaterals 0.266, epimerals 0.217, postero-marginals 0.288, coxals 0.115; pterothorax, width across anterior angles 0.638, greatest width 0.655; fore wings, length 1.95, lengths of subbasal setae 0.107, 0.132, and 0.137, respectively; abdomen, greatest width (at segment II) 0.610; tube (segment X, only), length 0.365, greatest subbasal width 0.160, least apical width 0.069; seta I on segment IX 0.410, II 0.090-0.101, III 0.381; terminal setae 0.358.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	87	100	190	157	126	103	83	49
Width (microns):	75	49	61	62	51	45	37	22
Total length of antenna,	0.895 mm.							

PERU: Rioja (Rio Negro), Dept. San Martin, November 16-22, 1936, Felix Woytkowski, 1 ♀ (holotype), from dead branches and leaves [Hood No. 1152]; San Domingo, Dept. Huanuco, November 27, 1937, F. W., 1 ♂ (allotype), from dry branches with leaves [Hood No. 1481].

Allied to the preceding species (*A. sculptilis*), from which its separation has already been discussed.

79. *Lathrobiothrips woytkowskii*, sp. nov.

Female (macropterous). — Length about 5.2 mm. (fully distended, 6.1 mm.). Color nearly uniform blackish brown, abdomen slightly paler in the more basal segments, the tube scarcely paler; legs concolorous with body, the tarsi not or only slightly paler; antennae nearly uniform blackish brown, somewhat paler only in base of III and at apex of II; fore wings brown at base (especially in scale) and with a broad brown median vitta extending nearly to tip, its second sixth with a narrow color-less median line; internal pigmentation bright red.

Head about 1.46 times as long as greatest width, which is at middle of cheeks, the width across eyes negligibly less; cheeks subparallel, converging only slightly to eyes and roundly narrowed to near basal collar, the width across the latter equal to the least width just behind eyes; median dorsal area of head only slightly arched and elevated; vertex flat, sloping downward to frontal costa, thus not at all overhanging; dorsal and lateral surfaces of head nearly smooth, lightly diagonally reticulo-substriate at sides in basal fourth; postocular setae brown, pale apically, curved, moderately long (146-150 microns), and pointed, 288 microns apart and 92 from eyes; all other cephalic setae brown, the longest on sides of cheeks about 30 microns long, the postocellars 26 long and 63 apart, the occipital pair 24 long, 69 apart, and arising 74-75 behind postoculars. Eyes a little more than one-fourth the length of head and with a few enlarged facets protruding at outer posterior angles, their dorsal length 150 microns, dorsal width 112, dorsal interval 158, ventral length 119, ventral width 87, ventral interval 207. Ocelli about 48 microns in diameter and situated close together, the posterior ones 44 microns apart and 34 from median ocellus; median ocellus directed nearly forward, overhanging, and with its



front margin about 46 microns behind that of eyes. Antennae seven-segmented, VII with a distinct ventral suture; sense-cones long, slender, and pointed, that on inner surface of segment III about 110 microns, the lower two on III-V strongly curved toward each other, and somewhat downward, beneath the following segments, the disposition of the sense-cones as follows on the inner (and outer) surfaces of the segments: III 1 (2), IV 2 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone large, heavy, broadly rounded at tip, not attaining posterior margin of prosternum, its extent beyond posterior dorsal margin of head about 308 microns; maxillary palpi moderately large and heavy, their second segment 91 microns long.

Prothorax with median line of pronotum about 0.67 that of head and contained in the trans-coxal width 2.24 times, its surface without sculpture; midline with distinct dark partial apodeme; all major setae present, all pointed or very nearly so, the antero-marginals (46-68 microns) and the antero-angulars (53 microns) dark brown, the others colorless apically and more or less tinted with brown at base, midlaterals 248, epimerals 249, postero-marginals 326, coxals 140. Pterothorax normal, its greatest width fully equal to that of prothorax. Legs strong, the fore tarsi with a long, (50 microns) strong, equilaterally-triangular tooth. Wings present, the fore pair 2.76 mm. long, nearly equal in width (273 microns) throughout, with about 56 accessory setae, and with three pointed yellowish subbasal setae disposed in a nearly straight line, their lengths respectively 134, 212, and 330 microns.

Abdomen equal in width to prothorax, the first nine segments with lightly polygonally reticulated areas; setae pale, most of them brownish at base and very slender apically, all long and pointed, the innermost pair on I only 168 microns, but their homologues on II and III respectively 449 and 423, the three major pairs on IX respectively 679, 594, and 511 microns long, the terminal ones dark brown at base and 336 microns long; tube (segment X, only) very long, nearly 1.3 times the length of head and heavily sclerotized, 3.2 times as long as greatest subbasal width (which is across the basal collar), this width three times the least apical width, its sides convex just beyond the basal collar, then straight and evenly converging to apical fourth, from where it is

abruptly narrowed to near tip, there abruptly constricted and parallel-sided in its last 10 microns.

Measurements of female (holotype), in mm.: Length about 5.19 (fully distended, 6.06); head, total median length 0.574, width across eyes 0.381, least width just behind eyes 0.370, greatest width across cheeks 0.388, least width near base 0.358, width across basal collar 0.371; prothorax, median length of pronotum 0.382, width (inclusive of coxae) 0.857; pterothorax, width across anterior angles 0.850, greatest width 0.910; abdomen, greatest width (at segment III) 0.857; tube (segment X, only), length 0.734, greatest subbasal width 0.228, least apical width 0.077.

Antennal segments:	1	2	3	4	5	6	7
Length (microns):	130	126	193	196	193	162	185
Width (microns):	104	65	82	77	66	50	42
Total length of antenna, 1.19 mm.							

PERU: San Pedro (region of Satipo, elevation about 900 m), Dept. Junin, May 3-29, 1935, Felix Woytkowski. 1 ♀, «from dry branches and tree-trunks» [Hood No. 1127].

Its large size will distinguish this species at once from its congeners.

#### 80. *Hoplothrips rufescens*, sp. nov.

Female (macropterous). — Length about 1.6 mm. (fully distended, 2.0 mm.). Color dark brown, with abundant red internal pigmentation; tube brown, paler in about apical half and narrowly so across base; legs about concolorous with body, all tarsi and the tips of all tibiae pale yellow; antennae with segments I, II, and IV-VIII concolorous with head, IV-VIII with pedicels paler, II paler apically, III palest in entire antenna, yellow in basal fourth, its remainder brown and darkened apically, but with an obscure paler band just before middle and a dark ring just beyond the basal fourth; fore wings light yellowish brown, darkest along margins of apical two-fifths.

Head of holotype with its total length about 1.4 times its greatest width, broadest across cheeks at posterior dorsal margin of eyes, the width across the eyes themselves only 0.9 as great; cheeks smooth, curving evenly but abruptly to eyes and converging somewhat concavely to just before base; dorsum of head elevated along median line posteriorly, very delicately striate on either side of median line at

base; vertex roundly, rather than subconically, produced, the median ocellus somewhat overhanging; postocular setae brown, dilated and divided at tip, 35-45 microns long, 110-115 apart, and 15-17 from eyes; other cephalic setae colorless, slender, pointed, minute, and very inconspicuous. Eyes small, scarcely protruding anteriorly, slightly more than one-fourth the length of head, a trifle longer dorsally than ventrally, without markedly enlarged facets posteriorly, their dorsal length 53-59 microns. Ocelli about 17 microns in diameter, the median one with its anterior margin on a line with that of eyes, posterior ones about 25 microns apart and 25 from median ocellus. Antennae with segment VIII lanceolate and III-VIII very briefly pedicellate; sense-cones moderately stout, tapering but not pointed, that on inner surface of III about 20 microns long, their disposition as follows on inner (and outer) surfaces of segments: III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsally. Mouth-cone large, extending to or beyond base of prosternum, the pointed labrum far surpassing the rounded labium, its extent beyond posterior dorsal margin of head (measuring to tips of labial palpi) 137-147 microns; maxillary palpi with segment II about 27 microns long.

Prothorax with median line of pronotum half as long as that of head and contained in trans-coxal width about 2.1 times, its anterior margin deeply concave, its surface smooth except for a few fine dark anastomosing striae along posterior margin, median apodeme short, dark, and delicate; all usual setae present, dark brown, broadly dilated and divided at tip, the antero-marginals 33-37 microns, antero-angulars 37-49, midlaterals 27-34, epimerals 42-43, postero-marginals 37-42, and coxals 33-35. Pterothorax distinctly broader than prothorax. Fore wings 0.59-0.65 mm. long, slightly narrowed at middle, with 6-8 accessory setae, and with the three apically-dilated yellowish subbasal setae 37-39, 37-41, and 39-42 microns long, respectively. Legs short, with fore and hind femora somewhat enlarged; fore tarsi not toothed.

Abdomen distinctly broader than prothorax across coxae, its dorsum virtually without sculpture; median tergite of tergum I nearly equilaterally triangular, very faintly subreticulate, and with two widely-spaced pores near posterior margin; tube (segment X, only) about 0.42 the length of head, fully 1.7 times as long as greatest subbasal width,

the latter less than twice the apical width, sides of tube slightly concave; major setae long, all of them dilated at tip except the lateral pair on segment VII (which is 103 microns long), the three pairs on IX (111, 133, and 102 microns long, respectively, in holotype), and the terminal ones (154 microns in holotype); segment IX with setae I and II surpassing tip of tube.

Measurements of female (holotype), in mm.: Length about 1.58 (fully distended, 1.96); head, total median length 0.224, width across eyes 0.141, greatest width across cheeks 0.158, least width near base 0.140, width across basal collar 0.142; prothorax, median length of pronotum 0.110, width (inclusive of coxae) 0.225; mesothorax, width across anterior angles 0.251; abdomen, greatest width (at segment IV) 0.262; tube (segment X, only, length 0.095, greatest sub-basal width 0.056, least apical width 0.033.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	30	44	44	47	51	43	40	37 (holotype)
	29	40	40	41	44	38	37	34 (paratype)
Width (microns):	33	26	25	27	25	22	20	14 (holotype)
	32	25	25	27	26	22	20	14 (paratype)
Total length of antenna, 0.336 (0.303) mm.								

PANAMÁ: Porto Bello, July 10, 1933, J. D. H., 2 ♀, from beneath bark on a branch of a small dead tree, in a rice field on top of a hill behind the town [Hood No. 988].

This species is allied to the widely distributed *delicatulus*, but may easily be distinguished by the slenderer, fewer sense-cones, the toothless fore tarsi, and the form of the median tergite of the first abdominal segment.

# 81. *Frankliniella pineticola*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (fully distended, 1.5 mm.). Color dark brown, blackish in last few abdominal segments, thorax with orange-red internal pigmentation; head paler (nearly yellow) in front of ocelli, narrowly darker along cheeks, and with the occipital apodeme black; legs paler than body, the fore pair yellow with femora somewhat shaded with brown, especially on outer surface, the middle and hind femora successively darker, paler at either end, especially the middle pair, middle and hind tibiae yellow, more or less heavily shaded with gray or brown on outer surface and across middle; antennae with segment I paler

than II, especially across base, II concolorous with darker portions of head, III-V yellow, III very slightly darkened apically, IV dark brown in apical half, V paler than IV, only lightly shaded apically, VI-VIII dark gray-brown, VI somewhat yellowish basally; fore wings dark brown throughout, save for a nearly colorless fleck between the third and fourth major setae on anterior vein.

Head, when horizontal, about as long as its least basal width and about 0.86 as long as the greatest width across cheeks, the trans-ocular width usually slightly greater; cheeks broadest shortly behind eyes, where they are distinguishably subangulate, thence nearly straightly converging to base, the basal width 0.85 that across eyes; dorsum of head with several distinct, dark, fine cross-striae posterior to the ocelli, one of them darker, heavier, and forming an «occipital line» which, like the other lateral striae, produces a slight serration in the cheeks; interocellar setae dark brown, about 46 microns long and 31 apart, arising slightly within the ocellar triangle; postoculars small and slender, about 23 microns long and 122 apart; dorsum of head with minor setae disposed as usual in the genus<sup>11</sup>. Eyes about 0.61 the total length of head, measuring as follows in microns in holotype: dorsal length 87, dorsal width 47, dorsal interval 71 — these measurements being to the edges of the contained facets. Ocelli about 18 microns in diameter, the posterior pair 35 apart and 19 from median ocellus. Antennae moderately stout, almost precisely twice the length of head; segment II very slightly elevated on dorsum near apex, but not produced, the prominent dark setae about 29 microns long; III (formed almost exactly like that of *F. peruviana*) about 57 microns long and 2.5 times as long as wide; basal portion of its pedicel<sup>12</sup> about 6 microns long and 7 microns wide at apex, which is broadest, its sides concave; apical portion of pedicel firmly united to basal portion, about 6 microns long and 11-12 microns wide, forming a tapering ring-like swelling which is sharply separated by a deep incision from the swollen distal part of the segment itself; forked sense-cones on segments

<sup>11</sup>) For a description of the usual chaetotactic arrangement in *Frankliniella*, see Hood, Rev. d. Ent., 7 (1): 97, 1937.

<sup>12</sup>) For explanation of this phrase, see Hood, Rev. d. Ent., 7 (1) 97, 1937.

III and IV quite short, that on III with its axis about 24 microns. Mouth-cone short, its length from base of labrum about 74 microns.

Prothorax nearly as long as head (0.94 in holotype) and about 1.35 times as wide as long, its sculpture consisting of delicate, pale, widely-spaced lines, excepting near both the anterior and posterior margins, where they are darker and heavier; major setae long and prominent, measuring as follows in microns: antero-marginals 46-54, antero-angulars 56, outer pair at posterior angles 80, inner pair 87, large submedian pair on posterior margin 30; minor prothoracic setae disposed as usual in the genus, except that there are only 2-3 pairs on central part of disk. Fore wings about 0.735 mm. long and 60 microns wide at middle, holotype with 22 setae on costal margin (those at middle of wing 62 microns long), anterior vein with one minute seta near base followed by three successively longer ones and then by 14-15, posterior vein with 14, of which the most distal is longest.

Abdomen of normal form and structure; tergum VIII with comb complete but sparse, the longest microtrichia about 11 microns; tergum X divided in about distal three-fourths; seta I on IX of holotype 86-95 microns, II 105, III 79-110; seta I on X 109, II 103.

Measurements of female (holotype), in mm.: Length about 1.26 (fully distended, 1.50); head, total length 0.142, width across eyes 0.165, least width just behind eyes 0.161, greatest width across cheeks 0.166, least width near base 0.140; prothorax, median length of pronotum 0.134, width 0.181; pterothorax, width across anterior angles 0.214, greatest width 0.249; abdomen, greatest width (at segment IV) 0.265.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	24	38	57	52	36	49	10	15
Width (microns)	30	26	23	21	18	19	7	5
Total length of antenna, 0.281 mm.								

CUBA: Las Mercedes (north of Vinales), Pinar del Rio, March 28, 1939, Professor J. Chester Bradley, 1 ♀ (holotype), «from flowering shrubs among pines»; Candelaria, Pinar del Rio, March 29, 1939, J. C. B., 2 ♀♀ without further data.

This little species is clearly allied to *peruviana*. Its antennae and head are differently colored, however, and the second antennal segment

is differently formed, with the subapical dorsal setae strong, prominent, and only slightly smaller than the corresponding pair on the third segment.

82. *Frankliniella bondari*, sp. nov.

**Female** (macropterous). — Length about 1.2 mm. Color uniform bright pale yellow, without markings of any sort, the ocellar pigmentation bright red, the legs and antennae concolorous with body, segment V of antennae lightly and almost indistinguishably shaded with gray in apical third, VI shaded with pale brown in about apical half, VII and VIII light brown, VIII often somewhat darker; fore wings lightly washed with brownish yellow; all major setae, including those on wings, pale yellow.

**Head**, when horizontal, distinctly shorter than its least basal width and about 0.86 as long as the greatest width across cheeks, the trans-ocular width distinctly greater; cheeks nearly straight, subparallel, only very slightly narrowed just behind eyes and again at base; dorsum of head virtually without sculpture, the cheeks only slightly serrate; interocellar setae about 54 microns long and 22 apart, arising well within the ocellar triangle on a line with anterior margin of posterior ocelli; postoculars small and slender, about 32 microns long and 128 apart; dorsum of head with the minor setae disposed as usual in the genus, except that there are only two pairs behind the posterior ocelli and mediad of the large postocular pair. Eyes small, less than one-half the total length of head, measuring as follows in microns in holotype: dorsal length 60, dorsal width approximately 39, dorsal interval approximately 75 — these measurements being to the edges of the contained facets. Ocelli about 13 microns in diameter, the posterior pair 38 apart and 24 from median ocellus. Antennae moderately slender, about 2.27 times the length of head; segment II not elevated on dorsum near apex and not produced, its setae short, pale, and inconspicuous; III about 48 microns long and 2.4 times as long as wide; basal portion of its pedicel about 7 microns long and 6 microns wide subapically, where it is broadest, normal in form to the group; apical portion of pedicel firmly united to the swollen distal portion of the segment itself, 6-7 microns long and 11 microns wide; forked sense-cones on segments III and IV nearly V-shaped, with short, nearly straight arms, the sense-cone on III situated on latero-dorsal surface and

with its axis about 14 microns long. Mouth-cone moderate, its length from base of labrum about 88 microns, its length beyond posterior dorsal margin of head about 113 microns.

Prothorax slightly longer than head and about 1.35 times as wide as long, its surface smooth; major setae long and prominent, measuring as follows in microns in holotype: antero-marginals 43, antero-angulars 67, outer pair at posterior angles 85, inner pair 63, large submedian pair on posterior margin 31; minor prothoracic setae disposed as usual in the genus, except that there are none on central part of disk. Fore wings about 0.644 mm. long and 48 microns wide at middle, holotype with 18 setae on costal margin (those at middle of wing 49 microns long), anterior vein with one minute seta near base followed by 16, posterior vein with 12, of which the most distal is longest.

Abdomen of normal form and structure; tergum VIII with posterior margin crenulate, without comb; tergum X divided in about distal three-fourths; seta I on IX of holotype 141 microns, II 164, III 154; seta I on X 164, II 156.

Measurements of female (holotype), in mm.: Length about 1.22; head, total length 0.126, width across eyes 0.154, least width just behind eyes 0.143, greatest width across cheeks 0.147, least width near base 0.142; prothorax, median length of pronotum 0.133, width 0.180; pterothorax, width across anterior angles 0.211, greatest width 0.246; abdomen, greatest width (at segment IV) 0.283.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	25	39	48	48	38	56	13	19
Width (microns):	34	28	20	18	18	19	8	6
Total length of antenna, 0.286 mm.								

BRAZIL: Bahia, 7 ♀♀, collected by Dr. Gregorio Bondar on *Polyanthes tuberosa* [No. 1007, his letter of March 17, 1926].

Very suggestive of *williamsi* and easily confused with that species, but without comb on abdominal tergum VIII and differing in the chaetotaxy of the head and prothorax, as well as in color.

### 83. *Frankliniella trinidadensis*, sp. nov.

Female (brachypterous). — Length about 1.0 mm. Color uniform bright golden yellow, without markings of any sort, the ocellar pigmentation bright red, the legs slightly paler



than body; antennae pale yellow, segment I palest, II lightly shaded with gray throughout, III only in apical portion beyond setae, IV gray-brown in apical half, V in pedicel and apical three-fourths, VII-VIII gray-brown throughout, paler subbasally; fore wings apparently concolorous with body, barely visible.

Head distinctly shorter than its least basal width and about 0.86 as long as the greatest width across cheeks, the trans-ocular width distinctly greater; cheeks nearly straight, subparallel, with the usual postocular subangulation, only very slightly narrowed just behind eyes and again at base; dorsum of head with distinct cross-striae in the area posterior to eyes, the cheeks only slightly serrate; interocellar setae brownish yellow, about 43 microns long and 25 apart, arising well within the ocellar triangle slightly behind the posterior margin of median ocellus; postoculars small and slender, about 36 microns long and 113 apart; dorsum of head with the minor setae disposed as usual in the genus. Eyes small, but more than one-half the total length of head, measuring as follows in microns in holotype: dorsal length 67, dorsal width approximately 40, dorsal interval approximately 70 — these measurements being to the edges of the contained facets. Ocelli about 8 microns in diameter, the posterior pair 42 apart and 24 from median ocellus. Antennae moderately slender, about 2.26 times the length of head; segment II not elevated on dorsum near apex and not produced, its setae short, pale, and inconspicuous; III slender, about 52 microns long and 2.9 times as long as wide; basal portion of its pedicel about 7 microns long and 6 microns wide subapically, where it is broadest, normal in form to the group; apical portion of pedicel firmly united to the swollen distal portion of the segment itself, 6-7 microns long and 11 microns wide; forked sense-cones on segments III and IV broadly V-shaped, with short, nearly straight arms, the sense-cone on III situated on latero-dorsal surface and with its axis about 11 microns long. Mouth-cone moderate, its length from base of labrum about 101 microns, its length beyond posterior dorsal margin of head about 129 microns.

Prothorax about 1.1 times as long as head and about 1.24 times as wide as long, its surface smooth; major setae yellowish brown, long and prominent, measuring as follows in microns in holotype: antero-marginals 62, antero-angulars

57, outer pair at posterior angles 59, inner pair 71, large submedian pair on posterior margin 37; minor prothoracic setae disposed as usual in the genus, except that there are two pairs between the antero-marginals. Fore wings about 73 microns long.

Abdomen of normal form and structure, nearly 1.6 times as broad as prothorax, with large, prominent, brown tergal setae disposed as is usual in brachypterous forms of this group; tergum VIII without comb; tergum X divided in about distal three-fourths; seta I on IX of holotype 134 microns, II 175, III 176; seta I on X 167, II 148.

Measurements of female (holotype), in mm.: Length about 1.04; head, total length 0.125, width across eyes 0.151, least width just behind eyes 0.141, greatest width across cheeks 0.145, least width near base 0.138; prothorax, median length of pronotum 0.140, width 0.174; pterothorax, width across anterior angles 0.182, greatest width 0.200; abdomen, greatest width (at segment V) 0.276.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	24	39	52	44	41	52	13	17
Width (microns):	34	27	18	17	17	18	8	6
Total length of antenna, 0.282 mm.								

TRINIDAD: St. Clair, April 18, 1916, Dr. C. B. Williams, 1 ♀, swept from grass [Williams No. 786].

Very close to *bondari*, the preceding species, but differing especially in the chaetotaxy of the head and pronotum.

#### 84. *Frankliniella solidaginis*, sp. nov.

Female (macropterous). — Length about 1.2 mm. Color nearly uniform yellowish white, without markings of any sort, darker in head, thorax, and tip of abdomen; ocellar pigmentation yellow-brown; legs and antennae about concolorous with body, segment II of antennae apparently darker, because of opaque internal pigmentation, III-V just distinguishably shaded with gray apically, VI-VIII gray-brown, except the yellow basal third of VI; fore wings nearly colorless.

Head distinctly shorter than its least basal width and only 0.7 as long as the greatest width across cheeks, the trans-ocular width distinctly greater; cheeks slightly convex, converging to eyes and to base, without a postocular subangulation; dorsum of head with light cross-striae in the area

posterior to eyes, the checks only slightly serrate; inter-ocular setae pale brownish yellow, about 19 microns long and 30 apart, arising well within the ocellar triangle distinctly in advance of front margin of posterior ocelli; postoculars small and slender, about 10 microns long and 123 apart; dorsum of head with the minor setae disposed as usual in the genus. Eyes much more than one-half the total length of head, their dorsal length 60 microns. Ocelli about 14 microns in diameter, the posterior pair 38 apart and 25 from median ocellus. Antennae moderately slender, about 2.4 times the length of the short head; segment II not elevated on dorsum near apex and not produced, its setae short, pale, and very inconspicuous; III slender, about 48 microns long and 2.5 times as long as wide; basal portion of its pedicel obtusely subangulate at middle, apical portion firmly united to the swollen distal portion of the segment itself; forked sense-cones on III and IV U-shaped, with short, slightly curved arms, the sense-cone on III situated on dorsal surface and with its axis about 16 microns long. Mouth-cone moderate, its length from base of labrum about 87 microns, its length beyond posterior dorsal margin of head about 107 microns.

Prothorax about 1.2 times as long as head and about 1.5 times as wide as long, its surface smooth; major setae gray-brown, unusually short, measuring as follows in microns in holotype: antero-marginals 16, antero-angulars 16, outer pair at posterior angles 23, inner pair 42, large submedian pair on posterior margin 20; minor prothoracic setae disposed as usual in the genus. Fore wings about 0.64 mm. long and 59 microns wide at middle, the setae yellowish gray, costa with 25 (those at middle 31 microns long), anterior vein with a small one at base followed by three successively longer ones and then by 18-19, hind vein with 16-18.

Abdomen of normal form and structure, nearly 1.5 times as broad as prothorax; tergum VIII without comb; setae on apical segments strong and dark brown, I on IX of holotype 87 microns, II 97, III 89; seta I on X 85, II 75.

Mesurements of female (holotype), in mm.: Length about 1.24; head, total length 0.103, width across eyes 0.152, least width just behind eyes 0.150, greatest width across cheeks 0.155, least width near base 0.132; prothorax, median length of pronotum 0.125, width 0.194; pterothorax, width

across anterior angles 0.220, greatest width 0.330; abdomen, greatest width (at segment V) 0.284.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	27	38	48	39	34	43	7	12
Width (microns):	29	24	19	20	19	19	7	6
Total length of antenna, 0.248 mm.								

TEXAS: Pecos, September 5, 1927, J. D. H., 6 ♀♀, from flowers of Goldenrod (*Solidago* sp.) [Hood No. 942].

Allied to *tritici*, but very pale in color and with all of the prothoracic setae very short, excepting only the inner pair at posterior angles.

### 85. *Frankliniella rex*, sp. nov.

Female (macropterous). — Length about 2.5 mm. (fully distended, about 3.0 mm.). Color dark blackish brown (black under low magnifications); all femora concolorous with body, extreme bases of middle and hind pairs yellow; fore tibiae golden yellow, sometimes lightly washed with brown, middle and hind pairs, respectively, with their basal third and half yellow, their remainder rapidly shading to nearly black at tip; tarsi yellowish brown, the hind pair often darkest; antennae with segments I and V-VIII dark blackish brown, II decidedly paler, usually largely yellowish brown, always yellow in median apical portion, III pale yellow in basal third, shading to yellowish brown apically, where it is often infusate, IV blackish brown in apical half or more, fading to yellow in basal sixth, V paler subbasally; fore wings darkest at base and at basal third, the intervening portion nearly colorless, the remainder uniform brown; major setae on body, antennae, and wings nearly black.

Head unusually long for the genus, its total length equal to the greatest width across eyes, its base with the usual broad, nearly black, submarginal apodeme; cheeks broadest across the usual subangulation behind eyes, thence straight and converging to the occipital line, where the head is abruptly widened again and from whence its cheeks converge roundly to the short, parallel-sided basal collar, the head of holotype (and, in parentheses, of a caustic-treated topotypic paratype) measuring as follows in microns: length 217 (210), width across eyes 216 (210), least width shortly behind eyes 204 (199), greatest width across cheeks 207 (204), width

across angulation formed by occipital line 202 (199), least width near base 167 (165); dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, those striae in front of occipital line close together and indistinct, those behind it more widely spaced and nearly black, all of them producing a faint serration in the cheeks; interocellar setae long (108 microns in holotype, 86 in the paratype mentioned), strong, situated on a line with front margin of posterior ocelli, and 31-36 microns apart; postoculars prominent, 68-70 microns long and thus much more than one-half the length of eyes, their interval about 158 microns; head with all minor setae disposed as usual in the genus. Eyes about one-half the length of head, measuring as follows in microns in the caustic-treated paratype: dorsal length 106, dorsal width 56, least dorsal interval 98, ventral length (head horizontal!) 70, ventral width 54, least ventral interval 102 — these measurements being to the edges of the contained facets. Ocelli 22-24 microns in diameter, the posterior pair 40 apart and 26 from median ocellus. Antennae slender, about 2.2 times the length of head; segment III 97 microns long in holotype and about three times as long as wide, basal portion of its pedicel about 11 microns long and broadened in apical half or more, the greatest width about 12 microns, apical portion of pedicel closely connected with the broadened remainder of the segment, separated from basal portion of pedicel by a weakened pale ring, its greatest width (at apex) 17-18 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 32 microns long; dorsal pair of setae on II and III about 56 and 70 microns, respectively.

Prothorax about 1.1 times as long as head, its width nearly 1.3 times its length, with a few shallow, transverse corrugations near both anterior and posterior margins; major setae very long and prominent, measuring as follows in microns: antero-marginals 158-169, antero-angulars 158-161, outer pair at posterior angles 154-179, inner 158, large submedian pair on posterior margin 54-103; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement. Fore wings about 1.8 mm. long, 113 microns broad at middle, costa of holotype with 36 long setae (those

at middle of wing 152 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 21-22, posterior vein with 21-23.

Abdomen of normal form and structure, but with terga II-VIII polygonally subreticulate, the reticles nearly equilateral and not arranged in evident transverse rows; tergum VIII with comb on posterior margin complete, close, and regular, the longest individual microtrichia about 29 microns; terga VII-X of holotype measuring respectively as follows: 185, 148, 108, 130, X about 108 wide at base and completely divided; seta I on IX of holotype 185 microns, II 236, III 242; seta I on X 220, II 232.

Measurements of female (holotype and a caustic-treated topotypic paratype, those of the latter in parentheses), in mm.: Length about 2.52 (2.45), fully distended 2.98 (2.84); head, total median length 0.217 (0.210), width across eyes 0.216 (0.210), least width just behind eyes 0.204 (0.199), greatest width across cheeks 0.207 (0.204), least width near base 0.167 (0.165), width across occipital line 0.202 (0.199); prothorax, median length of pronotum 0.239 (0.237), width 0.308 (0.294); pterothorax, width across anterior angles 0.381, greatest width 0.490; abdomen, greatest width (at segment III) 0.452; seta I on abdominal segment IX, length (0.197), II (0.225), III (0.238), seta I on X (0.225), II (0.225).

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	46	68	97	86	63	77	16	21 (holotype)
	45	67	93	81	69	81	15	22 (paratype)
Width (microns):	45	34	32	30	26	27	11	7 (holotype)
	45	33	32	30	26	27	11	7 (paratype)
Total length of antenna, 0.474 (0.473) mm								

Male (macropterous). — Color yellow, with last two abdominal segments, and all major setae, nearly black; abdominal segments V and VI yellow, but each with a brown area behind middle, that on VI larger and extending almost across the segment, VII yellow in basal third and nearly black beyond, VIII yellowish in basal half, especially at sides; legs yellow, with middle and hind femora lightly shaded with brown across middle, and middle and hind tibiae more heavily shaded with brown in apical half or more, the hind tibiae darkest and blackish brown at tip, all tarsi brownish yellow; antennae with segments I-III largely yellow, V-VIII nearly black, II slightly darker than either I or III and with

a brownish cast, III infusate apically, IV yellow in about basal fifth, then abruptly brown and shading to nearly black at tip, V with a brief pale area just beyond the narrow pedicel; fore wings brownish yellow, darkened apically.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent to the antecostal suture, that on IV about 43 microns in width and 22 in length; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair (about 66 microns long, 5 microns in diameter near base, and 23 apart) much longer and stouter than the lateral pair (27 microns long and 94 apart), which arise 12-14 microns anteriorly, the third pair paler and smaller (20 microns long), about 50 microns apart, and situated 14-16 microns behind the first pair, the usual pair of pores with their centers 58 microns apart and situated about 7 microns cephalad of the first pair of setae; segment IX with the posterior pair of dorso-lateral setae fully 6 microns in diameter and 182 long, the other pair scarcely as stout and 168 microns long; X with its upper pair of major setae a trifle stouter than the more posterior pair on IX and about 168 microns long, the lower pair more slender and also 168 microns long.

Measurements of male (allotype), in mm.: Length about 1.89 (fully distended, 2.16); head, total median length 0.185, width across eyes 0.185, least width just behind eyes 0.168, greatest width across cheeks 0.175, width at occipital line 0.168, least width near base 0.143; postocular setae, length 0.062, interval 0.136; interocellar setae, length 0.084, interval 0.027; prothorax, median length of pronotum 0.181, width 0.234; antero-marginal setae, length 0.139, antero-angulars 0.117, outer pair at posterior angles 0.134, inner pair 0.129, large submedian pair on posterior margin 0.063-0.070; pterothorax, width across anterior angles 0.283, greatest width 0.346; fore wings, length 1.30, width at middle 0.084, length of costal setae at middle of wing 0.123; abdomen, greatest width (at segment III) 0.260.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	38	60	86	76	61	74	14	19
Width (microns):	39	32	27	26	24	26	10	7
Total length of antenna, 0.428 mm.								

PERU: Shishmay (elevation about 3000 m.), Dept. Huanuco, September 15-17, 1937, Felix Woytkowski,

7 ♀♀ and 1 ♂ (including holotype and allotype), «from shrubs» [Hood No. 1444], and 4 ♀♀, «from purple flowers of a tree» [Hood No. 1438].

Like *regalis*, described immediately below, this is allied to *regina* and is a member of a group of giant species known only from Peru. It differs from both the species just named in the coloration of the male and in the sculpture of the abdominal terga.

86. *Frankliniella regalis*, sp. nov.

Female (macropterous). — Length 2.2-2.4 mm. (fully distended, about 2.8 mm.). Color dark blackish brown (black under low magnifications); all femora concolorous with body, extreme bases of middle and hind pairs yellow; fore tibiae golden yellow, sometimes lightly washed with brown, middle and hind pairs, respectively, with their basal fourth and third, or more, yellow, their remainder rapidly shading to nearly black; tarsi yellow or brownish yellow; antennae with segments I and V-VIII dark blackish brown, II and III bright yellow, II sometimes very lightly infusate basally, III nearly white basally, IV brown or blackish brown in apical half or more, fading to pale yellow in basal sixth, V paler subbasally; fore wings brown in basal half of scale, in about the third seventh, and again in apical two-fifths, their remainder nearly colorless; major setae on body, antennae, and wings nearly black.

Head unusually long for the genus, its total length equal to the greatest width across eyes, its base with the usual broad, nearly black, submarginal apodeme; cheeks broadest across the usual subangulation behind eyes, thence straight or slightly concave and converging to the occipital line, where the head is abruptly widened again and from whence its cheeks converge roundly to the short, parallel-sided basal collar, the head of holotype (and, in parentheses, of a caustic-treated topotypic paratype) measuring as follows in microns: length 204 (216), width across eyes 206 (209), least width just behind eyes 195 (200), greatest width across cheeks 202 (203), width across angulation formed by occipital line 195 (196), least width near base 165 (164); dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, those striae in front of occipital line close together and indistinct, those behind it more widely spaced and nearly black, all or most of them producing a faint serration



in the cheeks; interocellar setae long (100 microns in holotype), strong, situated on a line with front margin of posterior ocelli, and 32-37 microns apart; postoculars prominent, about 72 microns long and thus much more than one-half the length of eyes, their interval about 154 microns; head with all minor setae disposed as usual in the genus. Eyes about one-half the length of head, measuring as follows in microns in the caustic-treated paratype previously mentioned: dorsal length 107, dorsal width 56, least dorsal interval 97, ventral length (head horizontal!) 67, ventral width 54, least ventral interval 101 — these measurements being to the edges of the contained facets. Ocelli 20-24 microns in diameter, the posterior pair 47 apart and 27 from median ocellus. Antennae slender, 2.3-2.4 times the length of head; segment III 103-105 microns long in holotype and more than three times as long as wide, basal portion of its pedicel about 12 microns long and broadened in apical half or more, the greatest width about 12 microns, apical portion of pedicel closely connected with the broadened remainder of the segment, separated from basal portion of pedicel by a weakened paler ring, its greatest width (at apex) about 17 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 36 microns long; dorsal pair of setae on II and III about 61 and 71 microns long, respectively.

Prothorax scarcely 1.1 times as long as head, its width nearly or quite 1.3 times its length, with a few shallow, transverse corrugations near posterior margin; major setae very long and prominent, measuring as follows in microns in two specimens: antero-marginals 147-150, antero-angulars 154-157, outer pair at posterior angles 154-168, inner 160, large submedian pair on posterior margin 64-90; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement. Fore wings about 1.6 mm. long, 110 microns broad at middle, costa of holotype with 33-34 long setae (those at middle of wing 141 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 21-22, posterior vein with 20-21.

Abdomen of normal form and structure, but with terga II-VIII polygonally subreticulate (rather than transversely striate), the reticles more or less equilateral but delicate and

arranged in evident transverse rows; tergum VIII with comb on posterior margin complete, close, and regular, the longest individual microtrichia about 27 microns; terga VII-X of holotype measuring respectively as follows: 144, 133, 106, 139; X about 109 wide at base and almost completely divided; seta I on IX of holotype 172-185 microns, II 206, III 230; seta I on X 234, II 220.

Measurements of female (holotype and a caustic-treated topotypic paratype, those of the latter in parentheses), in mm.: Length about 2.24 (2.35), fully distended 2.75 (2.79); head, total median length 0.204 (0.216), width across eyes 0.206 (0.209), least width just behind eyes 0.195 (0.200), greatest width across cheeks 0.202 (0.203), least width near base 0.165 (0.164), width across occipital line 0.195 (0.196); prothorax, median length of pronotum 0.221 (0.224), width 0.280 (0.301); pterothorax, width across anterior angles 0.349 (0.375), greatest width 0.434 (0.466); abdomen, greatest width (at segment IV) 0.437 (0.483); tergum VII, length (0.165), VIII (0.143), IX (0.110), X (0.127), basal width of X (0.100); seta I on abdominal segment IX, length (0.182), II (0.234), III (0.242), seta I on X (0.211), II (0.204).

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	47	70	105	87	63	80	13	22 (holotype)
	46	67	103	89	67	83	14	23 (paratype)
Width (microns):	43	33	31	29	25	26	10	7 (holotype)
	44	34	33	30	26	27	10	7 (paratype)
Total length of antenna, 0.487 (0.492) mm.								

Male (macropterous). — Color yellow, with last six abdominal segments, and all major setae, nearly black; abdominal segments V-VII narrowly yellow across most of base; fore legs yellow, with the coxae brown and the femora and tibiae lightly clouded with brown, middle and hind legs dark brown or blackish (the hind pair darker), the femora yellow at base and the middle femora yellow also at apex, the middle tibiae yellow in basal third, the hind tibiae yellow in basal two-fifths, all tarsi yellow shaded with gray or brown: antennae with segment I light brown, II and III bright lemon-yellow, III lightly infusate apically, IV yellow in about basal fifth and shading to dark blackish brown at tip, V-VIII blackish brown, V with a brief pale area just beyond the narrow pedicel; fore wings colored as in female.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent to the antecostal suture, that on IV about 77 microns in width and only 11 in length; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair (about 52 microns long, 4 microns in diameter near base, and 19 apart) much longer and stouter than the lateral pair (27 microns long and 95 apart), which arise 12 microns anteriorly, the third pair paler and smaller (14 microns long), about 50 microns apart, and situated 11 microns behind the first pair, the usual pair of pores with their centers 60 microns apart and situated about 6 microns cephalad of the first pair of setae; segment IX with the posterior pair of dorso-lateral setae about 7 microns in diameter and 151 long, the other pair scarcely as stout and 139 microns long; X with its upper pair of major setae about as stout as the more posterior pair on IX and 163 microns long, the lower pair more slender and 140 microns long.

Measurements of male (allotype), in mm.: Length about 1.85 (fully distended, 2.17); head, total median length 0.189, width across eyes 0.182, least width just behind eyes 0.169, greatest width across cheeks 0.172, width at occipital line 0.161, least width near base 0.137; postocular setae, length 0.061, interval 0.134; interocellar setae, length 0.072, interval 0.026; prothorax, median length of pronotum 0.171, width 0.225; antero-marginal setae, length 0.110, antero-angulars 0.116, outer pair at posterior angles 0.131, inner pair 0.123, large submedian pair on posterior margin 0.069; pterothorax, width across anterior angles 0.277, greatest width 0.333; fore wings, length 1.25, width at middle 0.083, length of costal setae at middle of wing 0.094; abdomen, greatest width (at segment IV) 0.274.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	60	91	77	57	73	14	19
Width (microns):	37	30	27	25	23	24	10	7-
Total length of antenna, 0.428 mm.								

PERU: Shishmay (elevation about 3000 m.), Dept. Huanuco, September 15-18, 1937, Felix Woytkowski, 11 ♀♀ and 1 ♂ (including holotype and allotype), «from shrubs» [Hood No. 1444]; also 6 ♀♀ and 4 ♂♂, «from purple flowers of a tree» [Hood No. 1438]; and 2 ♀♀, «from white flowers of a bush» [Hood No. 1443].

This strikingly colored species is very closely allied to *rex*, but may readily be known by the less heavy abdominal sculpture, the color of the fore wings in both sexes, and by the color of the body and legs of the male.

87. *Frankliniella regia*, sp. nov.

Female (macropterous). — Length about 2.0 mm. (fully distended, about 2.5 mm.). Color dark blackish brown (black or nearly so under low magnifications); all femora concolorous with body, extreme bases of middle and hind pairs, and trochanters, yellow; fore tibiae golden yellow, sometimes lightly washed with brown, middle and hind pairs with extreme bases yellow, their remainder rapidly shading to nearly black; tarsi yellow; antennae with segments I, II, and IV-VIII dark blackish brown, II briefly yellow apically, III yellow but more or less infusate apically, IV yellow in basal sixth, V paler subbasally; fore wings dark brown in apical three-fourths and in basal half of scale, the remainder of basal fourth nearly colorless; major setae on body, antennae, and wings nearly black.

Head long for the genus, its total length nearly equal to the greatest width across eyes, its base with the usual broad, nearly black, submarginal apodeme; cheeks broadest across the usual subangulation behind eyes, thence straight and converging to the occipital line, where the head is abruptly widened again and from whence its cheeks converge roundly to the short, parallel-sided, basal collar, the head of holotype measuring as follows in microns: length 193, width across eyes 200, least width just behind eyes 185, greatest width across cheeks 193, width across angulation formed by occipital line 183, least width near base 158; dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, those striae in front of occipital line close together and indistinct, those behind it more widely spaced and nearly black, all or most of them producing a faint serration in the cheeks; interocellar setae long (82 microns in holotype), strong, situated on a line with front margin of posterior ocelli and 34 microns apart; postoculars prominent, about 69 microns long and thus much more than one-half the length of eyes, their interval about 150 microns; head with all minor setae disposed as usual in the genus. Eyes about one-half the length of head, their dorsal length

98 microns, dorsal width about 54, least dorsal interval approximately 93. Ocelli about 22 microns in diameter, the posterior pair 49 apart and 26 from median ocellus. Antennae slender, 2.3 times the length of head; segment III 94 microns long in holotype and more than three times as long as wide, basal portion of its pedicel about 10 microns long and broadened in apical half or more, the greatest width about 11 microns, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened paler ring, its greatest width (at apex) about 15 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 25 microns long; dorsal pair of setae on II and III about 52 and 69 microns long, respectively.

Prothorax scarcely as long as head, its width 1.4 times its length, with a few shallow, transverse corrugations near posterior margin; major setae very long and prominent, measuring as follows in microns in holotype: antero-marginals 143, antero-angulars 130, outer pair at posterior angles 168, inner 150, large submedian pair on posterior margin 79; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement. Fore wings about 1.4 mm. long, 110 microns broad at middle, costa of holotype with 27-29 long setae (those at middle of wing 141 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 17-21, posterior vein with 18.

Abdomen of normal form and structure; terga transversely striate, rather than polygonally reticulate; tergum VIII with comb on posterior margin complete, close and regular, the longest individual microtrichia about 27 microns; terga VII-X of holotype measuring respectively as follows in microns; 140, 125, 86, 97; X about 99 wide at base and almost completely divided; seta I on IX of holotype 157, II 200, III 225; seta I on X 207, II 210.

Measurements of female (holotype), in mm.: Length about 2.03 (fully distended, 2.45); head, total median length 0.193, width across eyes 0.200, least width just behind eyes 0.185, greatest width across cheeks 0.193, least width near base 0.158, width across occipital line 0.183; prothorax, median

length of pronotum 0.189, width 0.265; pterothorax, width across anterior angles 0.332, greatest width 0.409; abdomen, greatest width (at segment IV) 0.433.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	43	64	94	79	58	70	13	23
Width (microns):	42	33	30	28	24	25	10	7
Total length of antenna, 0.444 mm.								

Male (macropterous). — Color of body and legs almost uniform yellow, the head and thorax somewhat more deeply so; antennae with segments I-III bright lemon-yellow, II with orange pigmentation apically, III lightly infusate beyond the apical setae, IV yellow in about basal half, shading to dark blackish brown at tip, V-VIII blackish brown, V with a brief pale area just beyond the narrow pedicel; fore wings uniform pale yellowish; all major setae on body, wings, and antennae nearly black.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent to the antecostal suture, that on IV about 64 microns in width and 26 in length; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair 53-58 microns long in allotype, 4 microns in diameter near base, and 19 apart, much longer and stouter than the lateral pair, which are 22 microns long and 86 apart, and which arise 12 microns anteriorly, the third pair paler and smaller (21 microns long and about 53 apart), situated 11 microns behind the first pair, the usual pair of pores with their centers 49 microns apart and situated about 6 microns cephalad of the first pair of setae; segment IX with the posterior pair of dorso-lateral setae about 7 microns in diameter and 143 long, the other pair scarcely as stout and 93 microns long; X with its upper pair of major setae about as stout as the more posterior pair on IX and 141 microns long, the lower pair more slender and 126 microns long.

Measurements of male (allotype), in mm.: Length about 1.64 (fully distended, 1.81); head, total median length 0.170, width across eyes 0.175, least width just behind eyes 0.161, greatest width across cheeks 0.162, width at occipital line 0.151, least width near base 0.131; postocular setae, length 0.056, interval 0.130; interocellar setae, length 0.080, interval 0.025; prothorax, median length of pronotum 0.145, width

0.203; antero-marginal setae, length 0.120, antero-angulars 0.105, outer pair at posterior angles 0.118, inner pair 0.120, large submedian pair on posterior margin 0.067; pterothorax, width across anterior angles 0.252, greatest width 0.305; fore wings, length 1.09, width at middle 0.083, length of costal setae at middle of wing 0.111; abdomen, greatest width (at segment IV) 0.263.

Antennal segments:	1	1	3	4	5	6	7	8
Length (microns):	35	56	82	69	54	73	11	19
Width (microns):	36	29	26	24	20	23	10	7
Total length of antenna, 0.399 mm.								

PERU: Almirante, Dept. Amazonas, December 23-26, 1936, Felix Woytkowski, 16 ♀♀ and 1 ♂ (including holotype and allotype), from flowers of unidentified plant [Hood No. 1172]; vicinity of Celendin, Dept. Cajamarca, June 6, 1936, F. W., 1 ♂, from flowers of *Delostoma dentatum* Don (det. by Dr. Paul C. Standley) [Hood No. 1199].

This species is a close relative of *regina*, but, aside from the very different color of the male, it may readily be known by the smaller size, the stouter antennal segments (especially the fifth), and the shorter prothorax.

88. *Frankliniella phaeaner*, sp. nov.

Female (macropterous). — Length about 1.8 mm. (fully distended, about 2.2 mm.). Color dark blackish brown (black or nearly so under low magnifications); legs concolorous with body, with only the trochanters, extreme bases of middle and hind femora, and tarsi slightly paler, the fore tibiae not at all yellow; antennae with segments I, II, and IV-VIII blackish brown, II briefly nearly colorless apically, III grayish yellow in basal half, shading to gray-brown beyond apical setae, IV, grayish yellow in basal fifth, V paler subbasally; fore wings dark brown in apical three-fourths, in scale, and at extreme base, the remainder of basal fourth nearly colorless; major setae on body, antennae, and wings nearly black.

Head long for the genus, its total length nearly equal to the greatest width (which is across eyes), its base with the usual broad, nearly black, submarginal apodeme; cheeks broadest across the usual (but slight) subangulation behind eyes, thence straight and converging only slightly to the occipital line, where the head is only slightly widened again

and from whence its cheeks converge roundly to the short, parallel-sided basal collar, the head of holotype measuring as follows in microns: length 175, width across eyes 181, least width just behind eyes 164, greatest width across cheeks 167, width across angulation formed by occipital line 162, least width near base 148; dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, those striae in front of occipital line close together and indistinct, those behind it more widely spaced and nearly black, all or most of them producing a faint serration in the cheeks; inter-ocellar setae long (77 microns in holotype), strong, situated on a line with front margin of posterior ocelli and 26 microns apart; postoculars prominent, about 53 microns long and thus much more than one-half the length of eyes, their interval about 129 microns; head with all minor setae disposed as usual in the genus, except that there are only two pairs between postoculars and posterior ocelli. Eyes about one-half the length of head, their dorsal length 88 microns, dorsal width about 53, least dorsal interval approximately 76. Ocelli about 18-20 microns in diameter, the posterior pair 38 apart and 23 from median ocellus. Antennae slender, 2.25 times the length of head; segment III 81 microns long in holotype and 2.8 times as long as wide, basal portion of its pedicel about 10 microns long and broadened in apical half or more, the greatest width about 10 microns, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened paler ring, its greatest width (at apex) about 16 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 19 microns long; dorsal pair of setae on II and III about 50 and 61 microns long, respectively.

Prothorax scarcely as long as head, its width about 1.4 times its length, with a few shallow, transverse corrugations near posterior margin; major setae long and prominent, measuring as follows in microns in holotype: anteromarginals 116, antero-angulars 126, outer pair at posterior angles 135, inner 135, large submedian pair on posterior margin 69; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement. Fore wings about 1.2 mm. long, 86 microns broad at middle, costa of holotype with 25-26 long setae (those at middle of wing



107 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 18, posterior vein with 15-16.

Abdomen of normal form and structure; terga transversely striate, rather than polygonally reticulate; tergum VIII with comb on posterior margin complete, regular, the longest individual microtrichia about 24 microns; terga VII-X of holotype measuring respectively as follows: 123, 110, 87, 105; X about 85 wide at base and divided in apical three-fourths; seta I on IX of holotype 155, II 195, III 196; seta I on X 157, II 172.

Measurements of female (holotype), in mm.: Length about 1.81 (fully distended, 2.17); head, total median length 0.175, width across eyes 0.181, least width just behind eyes 0.164, greatest width across cheeks 0.167, least width near base 0.148, width across occipital line 0.162; prothorax, median length of pronotum 0.163, width 0.227; pterothorax, width across anterior angles 0.283, greatest width 0.337; abdomen, greatest width (at segment IV) 0.368.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	37	57	81	70	51	64	13	21
Width (microns):	36	30	29	28	24	26	10	8
Total length of antenna, 0.394 mm.								

Male (macropterous). — Color of body, legs, wings, and antennae almost as in female, though the fore tibiae are more yellowish, especially apically, and the antennae sometimes nearly or quite lack the pale areas at the bases of segments IV and V; major setae nearly black.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent to the ante-costal suture, these highly variable in size, that on IV of allotype about 84 microns in width and 31 in length; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair 47 microns long in one paratype, 5 microns in diameter near base, and 18 apart, much longer and stouter than the lateral pair, which is 27 microns long and 75 apart, and which arises 12 microns anteriorly, the third pair paler and smaller (19 microns long and about 41 apart), situated 9-12 microns behind the first pair, the usual pores with their centers 43 microns apart and situated about 6 microns cephalad of the first pair of setae; segment IX

with the posterior pair of dorso-lateral setae about 6 microns in diameter and 127 long, the other pair scarcely as stout and 83 microns long; X with its upper pair of major setae about as stout as the more posterior pair on IX and 127 microns long, the lower pair more slender and 120 microns long.

Measurements of male (allotype), in mm.: Length about 1.50 (fully distended, 1.80); head, total median length 0.169, width across eyes 0.174, least width just behind eyes 0.159, greatest width across cheeks 0.160, width at occipital line 0.146, least width near base 0.133; postocular setae, length 0.050, interval 0.127; interocellar setae, length 0.067, interval 0.027; prothorax, median length of pronotum 0.148, width 0.199; antero-marginal setae, length 0.103, antero-angulars 0.106, outer pair at posterior angles 0.109, inner pair 0.109, large submedian pair on posterior margin 0.063; pterothorax, width across anterior angles 0.244, greatest width 0.297; fore wings, length 1.02, width at middle 0.080, length of costal setae at middle of wing 0.091; abdomen, greatest width (at segment IV) 0.256.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	35	53	73	66	50	67	10	21
Width (microns):	35	28	28	25	23	26	10	7
Total length of antenna, 0.375 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, May 24 and 25, 1936, Felix Woytkowski, 2 ♀♀ and 8 ♂♂ (including holotype and allotype taken May 24), from flowers of *Calceolaria trivialis* Kraenzl.? [Hood No. 1176], and 1 ♂, from flowers of *Eupatorium sternbergianum* DC. [Hood No. 1180], both plants determined by Dr. Paul C. Standley.

The closest relative of this species is doubtless *tuberosi*, but in it the fore tibiae and all of the tarsi are evidently much paler, while the male is said to be «mostly orange yellow» ... «with all femora and tibiae mostly yellow».

### 89. *Frankliniella cognata*, sp. nov.

Female (macropterous). — Length about 1.8 mm. Color dark brown, shading to blackish brown in last few abdominal segments; femora concolorous with body, the middle and hind pairs yellow at base, the fore pair yellow at apex, fore tibiae and all tarsi bright lemon yellow, middle and hind tibiae

concolorous with body but briefly paler (even yellow) at base; antennae with segments I, II, and VI-VIII dark gray-brown, II yellow in median portion at apex, III bright yellow, IV yellow in basal fourth and yellowish brown beyond, though not much darker than III, V dark gray-brown, abruptly yellow in most of basal sixth; fore wings with base of scale and apical three-fourths dark brown, the intervening portion nearly colorless.

Head moderately long, its length when horizontal fully 0.9 the greatest width across eyes and 1.2 times the least width at base, the latter with the usual dark submarginal apodeme narrow medially; cheeks broadest across the usual subangulation behind eyes, thence straight or slightly concave and converging to the occipital line, where the head is abruptly widened again and from whence its cheeks converge roundly to the short, parallel-sided basal collar, the head of holotype measuring as follows in microns: total length 182, width across eyes 195, least width just behind eyes 185, greatest width across cheeks 188, width across angulation formed by occipital line 179, least width near base 151; dorsum of head cross-striate in the entire area posterior to ocelli, those striae in front of occipital line close together and indistinct, those behind it more widely spaced and nearly black, all or most of them producing a distinct serration in the cheeks; interocellar setae long (85 microns in holotype), strong, situated on a line with front margins of posterior ocelli, and 38 microns apart; postoculars prominent, about 53 microns long and thus more than one-half the length of eyes, their interval about 143 microns; head with all minor setae disposed as usual in the genus. Eyes somewhat more than one-half the length of head, their dorsal length in holotype 97 microns, dorsal width about 54, least dorsal interval approximately 88. Ocelli about 20 microns in diameter, the posterior pair 45 apart and 24 from median ocellus. Antennae slender, nearly 2.2 times the length of head; segment III 80 microns long in holotype and about three times as long as wide, basal portion of its pedicel about 9 microns long and broadest at apical third, where it is almost subangulate and 9 microns wide, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened paler ring, its length about 7 microns, its greatest width (at apex) about

14, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 31 microns long; dorsal pair of setae on II and III about 44 and 55 microns long, respectively.

Prothorax a trifle longer than head, its width nearly 1.4 times its length, with a few shallow, transverse corrugations near posterior margin and a few striae near anterior margin; major setae very long and prominent, measuring as follows in microns in holotype: antero-marginals 120, antero-angulars 117, outer pair at posterior angles 140, inner 129, large submedian pair on posterior margin 66; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement. Fore wings about 1.2 mm. long and 94 microns broad at middle, costa of holotype with 25-27 long setae (those at middle of wing 99 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 17-19, posterior vein with 18.

Abdomen of normal form and structure, terga sparsely transversely striate; tergum VIII with comb on posterior margin complete, close, and regular, the longest individual microtrichia about 22 microns; terga VII-X of holotype measuring respectively as follows, in microns: 103, 114, 98, 109; X about 92 wide at base and almost completely divided; seta I on IX of holotype 160 microns, II 180, III 188; seta I on X 188, II 178.

Measurements of female (holotype), in mm.: Length about 1.79 (partially distended, 1.90); head, total median length 0.182, width across eyes 0.195, least width just behind eyes 0.185, greatest width across cheeks 0.188, least width near base 0.151, width across occipital line 0.179; prothorax, median length of pronotum 0.186, width 0.258; pterothorax, width across anterior angles 0.309, greatest width 0.374; abdomen, greatest width (at segment IV) 0.400.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	36	55	80	69	57	64	12	20
Width (microns):	38	29	27	25	22	22	9	7
Total length of antenna, 0.393 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, June 1-3, 1936, Felix Woytkowski, 1 ♀ (holotype), «from bush» [Hood No. 1187]; Chachapoyas, Dept. Amazonas,

December 19, 1936, F. W., 2 ♀♀, from flowers of *Spartium junceum* L. (determination by Dr. Paul C. Standley) [Hood No. 1145].

Though closely allied to *cestrum*, this species should prove readily separable because of the pronotal chaetotaxy and the much stouter terminal antennal segment.

90. *Frankliniella xanthaner*, sp. nov.

Female (macropterous). — Length about 1.4 mm. (fully distended, about 1.7 mm.). Color dark brown, abdomen often blackish brown; femora concolorous with body, the fore pair yellow at apex; fore tibiae, all tarsi, middle and hind trochanters, and bases of middle and hind tibiae, yellow, the remainders of tibiae nearly concolorous with body, though the middle ones are usually yellow at tip and somewhat paler than the hind pair; antennae with segments I, II, and VI-VIII blackish brown, II briefly nearly colorless apically, III bright yellow, infusate in about apical third, IV yellow in about basal half and brown beyond, V blackish brown, yellow sub-basally; fore wings dark brown in apical three-fourths, often somewhat paler apically, the remainder nearly colorless, scale and extreme base of wings not darkened; major setae on body, antennae, and wings blackish brown.

Head relatively short, its total length when horizontal scarcely 0.82 the greatest width (which is across eyes), its base with the usual broad, nearly black, submarginal apodeme; cheeks broadest, but not at all subangulate, in advance of anterior fourth, almost evenly arcuate between eyes and occipital line, converging straightly from there to the short, parallel-sided basal collar, the head of holotype measuring as follows, in microns: total median length 139, width across eyes 159, least width just behind eyes 155, greatest width across cheeks 158, width across angulation formed by occipital line 151, least width near base 130; dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, those striae in front of occipital line close together and indistinct, those behind it hardly more widely spaced and not darker, all or most of them producing an evident serration in the cheeks; interocellar setae long (67 microns in holotype), strong, situated slightly in advance of the line of front margin of posterior ocelli, and 25 microns apart; postoculars prominent, about 38 microns long and thus

scarcely one-half the length of eyes, their interval about 120 microns; head with all minor setae disposed as usual in the genus. Eyes nearly 0.6 the length of head, their dorsal length (in holotype) 80 microns, dorsal width 48, least dorsal interval 63, Ocelli 14-15 microns in diameter, the posterior pair 36 apart and 23 from median ocellus. Antennae moderately slender, about 2.1 times the length of head; segment III 61 microns long in holotype and somewhat more than 2.5 times as long as wide, basal portion of its pedicel about 7 microns long and broadened in apical half or more, the greatest width about 8 microns, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened paler ring, its greatest width (at apex) about 13 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 20 microns long; dorsal pair of setae on II and III about 33 and 40 microns long, respectively.

Prothorax about as long as head, its width about 1.3 times its length, with a few shallow, transverse corrugations near posterior margin and widely-spaced delicate striae in anterior fourth; major setae long and prominent, measuring as follows in microns in holotype: antero-marginals 88, antero-angulars 88, outer pair at posterior angles 93, inner 91, large submedian pair on posterior margin 52; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement, except that there are two pairs between the antero-marginals. Fore wings about 0.88 mm. long, 67 microns broad at middle, costa of holotype with 26-27 setae (those at middle of wing 68 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 17, posterior vein with 14-16.

Abdomen of normal form and structure; terga transversely striate, rather than polygonally reticulate; tergum VIII with comb on posterior margin complete, regular, the longest individual microtrichia about 23 microns; terga VII-X of holotype measuring respectively as follows: 92, 90, 79, 75; X about 66 wide at base and almost completely divided; seta I on IX of holotype 113, II 129, III 133; seta I on X 147, II 133.

Measurements of female (holotype), in mm.: Length about 1.39 (fully distended, 1.66); head, total median length

Ø.139, width across eyes 0.159, least width just behind eyes 0.155, greatest width across cheeks 0.158, least width near base 0.130, width across occipital line 0.151; prothorax, median length of pronotum 0.137, width 0.182; pterothorax, width across anterior angles 0.218, greatest width 0.262; abdomen, greatest width (at segment IV) 0.286.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	28	42	61	52	40	49	8	15
Width (microns):	30	26	24	24	20	20	8	6
Total length of antenna, 0.295 mm.								

Male (macropterous). — Color of body and legs almost uniform yellow, the head and thorax somewhat more deeply so; antennae largely yellow, segment II with orange internal pigmentation at apex, III infusate in apical third, IV and V dark gray-brown in apical half, V with its narrow pedicel also darkened, VI-VIII dark gray-brown, VI paler subbasally.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent to the antecostal suture; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair 30-34 microns long in one topotypic paratype, 3 microns in diameter near base, and 12 apart, much shorter than the lateral pair but equal in diameter to them, this pair 46-51 microns long and 61 apart, arising 7 microns anteriorly, the third pair pale and minute (about 9 microns long and 35 apart), situated 7 microns behind the first pair, the usual pores with their centers 34 microns apart and situated about 6 microns cephalad of the first pair of setae; segment IX with the dorso-lateral setae about 4 microns in diameter and 96 long, the other pair scarcely as stout and 52 microns long; X with its upper pair of major setae a trifle stouter than the more posterior pair on IX and 100 microns long, the lower pair more slender and 87 microns long.

Measurements of male (allotype), in mm.: Length about 1.25 (nearly fully distended, 1.39); head, total median length 0.140, width across eyes 0.155, least width just behind eyes 0.146, greatest width across cheeks 0.147, width at occipital line 0.137, least width near base 0.121; postocular setae, length 0.043, interval 0.113; interocellar setae, length 0.066, interval 0.022; prothorax, median length of pronotum 0.136, width 0.175; antero-marginal setae, length 0.086, antero-

angulars 0.089, outer pair at posterior angles 0.087, inner pair 0.086, large submedian pair on posterior margin 0.051; pterothorax, width across anterior angles 0.204, greatest width 0.248; fore wings, length 0.83, width at middle 0.063, length of costal setae at middle of wing 0.064; abdomen, greatest width (at segment IV) 0.202.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	29	45	62	50	43	53	9	15
Width (microns):	30	25	21	21	19	20	8	6
Total length of antenna, 0.306 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, May 24 to June 3, 1936, Felix Woytkowski, 55 ♀♀ and 14 ♂♂ (including holotype and allotype, taken May 30), from flowers of the following plants (determinations by Dr. Paul C. Standley): *Satureia tomentosa* (Kunth) Briq. (holotype and allotype from this), *Rubus floribundus* HBK., *Parosela boliviana* (Britton) Macbr., *Cassia latipetiolata* Dombey, *Raphanus Raphanistrum* L., *Verbena littoralis* HBK., and *Chaptalia nutans* (L.) Polak.; Chachapoyas, Dept. Amazonas, December 19, 1936, F. W., 14 ♀♀ and 1 ♂, from flowers of *Spartium junceum* L. (det. by Dr. Standley); Shishmay, Dept. Huanuco, September 19 and 21, 1937, F. W., 8 ♀, from flowers; Conchamarca, Dept. Huanuco, October 27-30, 1937, F. W., 6 ♀♀ (doubtless from flowers).

This common Peruvian species is closely allied to *cestrum*, but is smaller, with the last antennal segment shorter and relatively much stouter, and the male is yellow instead of brown.

#### 91. *Frankliniella castanea*, sp. nov.

Female (macropterous). — Length about 2.0 mm. (fully distended, about 2.3 mm.). Color nearly uniform rich chestnut brown; legs nearly concolorous with body, tarsi and fore tibiae paler, the latter yellowish brown; antennae with segments I and IV-VIII dark blackish brown, II yellowish brown, briefly yellow apically, III yellow in basal portion of pedicel, brownish yellow in remainder of basal third or half, and shading to blackish brown in apical third or more, IV-VI usually briefly paler subbasally; fore wings dark rich brown in apical five-sixths, in scale, and at base, the remainder of basal sixth mostly pale brownish, save for a small, nearly



colorless spot directly in front of the first seta on posterior vein; major setae on body, antennae, and wings dark blackish brown.

Head moderately long, its total length when horizontal about equal to the width across eyes, which is a trifle less than the greatest width across cheeks, its base with a broad, opaque black, submarginal apodeme; cheeks broadest across the usual subangulation behind eyes, thence straight and converging to middle, behind which the head is only slightly widened again, behind this last point converging roundly to the short, parallel-sided basal collar, there being no differentiated occipital line; head of holotype (and of a caustic-treated topotypic paratype) measuring as follows in microns: length 189 (183), width across eyes 196 (192), least width just behind eyes 190 (188), greatest width across cheeks 197 (196), greatest subbasal width 182 (188), least width near base 160 (161); dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, the more anterior striae less distinct, the more posterior ones darker and heavier, all or most of them giving rise to a pronounced tooth on the silhouette of the cheeks; interocellar setae moderately stout, less finely pointed than usual at tip, 60 microns long in holotype, arising a trifle in advance of the line of posterior ocelli, and 24 microns apart; postoculars prominent, rather stout, about 50 microns long and thus a little more than one-half the length of eyes, their interval about 140 microns; head with all minor setae disposed as usual in the genus. Eyes slightly more than one-half the length of head, their dorsal length (in a caustic-treated topotypic paratype) 95 microns, dorsal width 54, least dorsal interval 83, ventral length 60, ventral width 53, ventral interval 85. Ocelli 17-18 microns in diameter, the posterior pair 43 apart and 24 from median ocellus. Antennae moderately slender but less than 2.1 times the length of head; segment III 83 microns long in holotype and scarcely three times as long as wide, basal portion of its pedicel about 9 microns long and broadened in apical half or more, the greatest width about 9 microns, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened pale ring, its greatest width (at apex) about 16 microns, its sides convexly converging posteriorly; forked





PERU: vicinity of Shishmay, Dept. Huanuco, September 18-21, 1937, Felix Woytkowski, 10 ♀♀ and 12 ♂♂, most of them from «white flowers of a tree» [Hood Nos. 1447 and 1449].

This distinctive species is allied to *insularis*, but differs markedly in its darker color, shorter and stouter setae, longer head, and the size and form of the glandular areas on the abdominal sterna of the male, as well as in numerous other features mentioned in the above description.

92. *Frankliniella alticola*, sp. nov.

Female (macropterous). — Length about 1.4 mm. (fully distended, about 1.7 mm.). Color (of fresh specimens) bright orange-yellow, because of internal pigmentation which is brightest in thorax; head lightly shaded with brown; abdominal segments I-VIII with the subbasal tergal apodeme dark width just behind eyes 0.171, greatest width across cheeks brown, and the narrow area anterior to it (in terga III-VIII) lighter brown, the whole abdomen often shading to gray-brown in segments IX and X, but sometimes with IX and X, only, dark gray-brown; legs pale and nearly concolorous with body, the femora often darker because lightly shaded with gray; antennae with segment I pale grayish yellow and lighter in color than the other segments, II chestnut brown and darkest, III and IV gray-brown, darkest apically and nearly yellow basally, IV darker than III, V darker than IV and with a pale subbasal ring, VI-VIII dark gray-brown; fore wings uniform light yellowish brown; all major setae on body, antennae and wings dark brown.

Head moderately short, its total length when horizontal about 0.9 the greatest width, which is usually across eyes, though the width across cheeks shortly behind eyes is very nearly as great; base with the usual submarginal apodeme pale medially, dark brown laterally, only; cheeks broadest, but not subangulate, in advance of anterior fourth, converging and almost straight between that point and occipital line, and roundly converging between the latter and the short, parallel-sided basal collar, the head of holotype (and of a caustic-treated topotypic paratype) measuring as follows, in microns: total median length 140 (143), width across eyes 153 (158), least width just behind eyes 148 (149), greatest width across cheeks 154 (155), width across angulation formed by occi-

pital line 150 (148), least width near base 132 (125); dorsum of head cross-striate with anastomosing lines in the entire area posterior to ocelli, those striae in front of occipital line closer together and very indistinct, the two (or three) behind it more widely spaced and darker, all or most of them producing a slight serration of the cheeks; interocellar setae moderately long (52 microns in holotype), slender, situated a trifle behind the line of front margin of posterior ocelli, and 23 microns apart; postoculars about 39 microns long and thus about one-half the length of eyes, their interval 114-115 microns; head with all minor setae dark brown and readily visible, disposed as usual in the genus. Eyes less than 0.6 the length of head, their dorsal length (in a caustic-treated topotypic paratype) 79 microns, dorsal width 44, least dorsal interval 71, ventral length 50, ventral width 43, least ventral interval 72. Ocelli 15-19 microns in diameter (the median one smaller than the others), the posterior pair 41 apart and 22 from median ocellus. Antennae moderately slender, nearly 2.2 times the length of head; segment III 60 microns long in holotype and 2.5 times as long as wide, basal portion of its pedicel about 7 microns long and broadened in apical half or more, where it is finely angulate, the greatest width about 8 microns, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened paler ring, its greatest width (at apex) about 12 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 18 microns long; dorsal pair of setae on II and III about 33 and 40 microns long, respectively.

Prothorax less than 0.9 as long as head, its width about 1.5 times its length, with a few shallow, transverse corrugations near posterior margin, the remainder of pronotum smooth; major setae moderately long and prominent, measuring as follows in microns in holotype: antero-marginals 72, antero-angulars 72, outer pair at posterior angles 83-96, inner 86-88, large submedian pair on posterior margin 52-55; minor prothoracic setae slender, but conspicuous because of their dark color, normal in number and arrangement. Fore wings about 0.97 mm. long, 63 microns broad at middle, costa of holotype with 29-30 setae (those at middle of wing

63 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 20-21, posterior vein with 19.

Abdomen of normal form and structure; terga (excepting the basal one) almost perfectly smooth, not striate; tergum VIII with the comb on posterior margin complete, regular, the longest individual microtrichia about 21 microns; terga VII-X of holotype measuring respectively as follows: 93, 90, 69, 75; X about 66 wide at base and divided in about apical three-fourths; seta I on IX of holotype 66, II 109, III 107; seta I on X 122, II 120.

Measurements of male (allotype), in mm.: Length about 1.41 (fully distended, 1.63); head, total median length 0.140, width across eyes 0.153, least width just behind eyes 0.148, greatest width across cheeks 0.154, least width near base 0.132, width across occipital line 0.150; prothorax, median length of pronotum 0.120, width 0.182; pterothorax, width across anterior angles 0.218, greatest width 0.265; abdomen, greatest width (at segment IV) 0.249.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	29	47	60	52	41	53	9	13
Width (microns):	29	25	24	23	20	20	8	6
Total length of antenna, 0.304 mm.								

Male (macropterous). — Color of body and legs almost uniform yellow, the head and thorax somewhat more deeply so; antennae largely yellow, segment II concolorous with I, III-V yellow in basal half, their remainder and all of VI-VIII brown, V with its narrow pedicel darkened, VI with a very narrow subbasal pale ring.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent to the antecostal suture; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair 24-27 microns long in allotype, 3 microns in diameter near base, and 13 apart, much shorter than the lateral pair but equal in diameter to them, this pair about 43 microns long and 66 apart, arising 5 microns anteriorly, the third pair pale and minute (about 11 microns long and 38 apart), situated 10 microns behind the first pair, the usual pores with their centers 39 microns apart and situated about 3 microns cephalad of the first pair of setae; segment IX with the dorso-lateral setae about 4 microns in diameter and 100 long, the other

pair scarcely as stout and 61 microns long; X with its upper pair of major setae about as stout as the more posterior pair on IX and 97-108 microns long, the lower pair more slender and 96 microns long.

Measurements of male (allotype), in mm.: Length about 1.25 (fully distended, 1.48); head, total median length 0.137, width across eyes 0.151, least width just behind eyes 0.141, greatest width across cheeks 0.142, width at occipital line 0.137, least width near base 0.119; eyes, dorsal length 0.075; postocular setae, length 0.041, interval 0.111; interocular setae, length 0.059, interval 0.022; prothorax, median length of pronotum 0.124, width 0.169; antero-marginal setae, length 0.077, antero-angulars 0.083, outer pair at posterior angles 0.080-0.083, inner pair 0.087, large submedian pair on posterior margin 0.048; pterothorax, width across anterior angles 0.203, greatest width 0.237; fore wings, length 0.81, width at middle 0.058, length of costal setae at middle of wing 0.062; abdomen, greatest width (at segment IV) 0.188.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	28	42	58	46	37	47	8	14
Width (microns):	30	25	22	20	20	19	9	6
Total length of antenna, 0.280 mm.								

PERU: vicinity of Shishmay, Dept. Huanuco, September 17, 1937, Felix Woytkowski, 12 ♀♀ and 2 ♂♂, (from flowers of Condor's Egg), a white-flowered plant growing at an elevation of about 3000 m., in the puna-grass region. [Hood No. 1442].

The odd colorational scheme, and the slightly angulate pedicel of the third antennal segment, should permit the immediate recognition of this species.

### 93. *Frankliniella curta*, sp. nov.

Female (macropterous). — Length about 0.9 mm. Color yellow, with abdomen shading to dark brown in last three or four segments, the pterothorax bright orange because of dense internal pigmentation, the cheeks lightly brownish, the pterothorax with a pair of central gray spots occupying the large metanotal sclerite (these spots visible only by reflected light); ocellar pigmentation dark red; legs pale yellow, with the morphologically upper surface of all femora shaded with gray or brown; antennae with segment I concolorous with

head, II decidedly darker because shaded with brown, especially laterally, III somewhat darker than I, lightly shaded with gray beyond pedicel, IV-VIII light yellowish brown, IV and V with their pedicels yellow, VI-VIII unicolorous; fore wings nearly uniform light yellowish brown, not paler subbasally.

Head short, its length scarcely 0.8 its least basal width and only 0.73 the greatest width across eyes, the trans-ocular width slightly greater; cheeks slightly convex, converging to eyes and to base, without a postocular subangulation and with only a slight tooth at occipital line, the head of the unique holotype measuring as follows in microns: total length 91, width across eyes 125, least width just behind eyes 121, greatest width across cheeks 124, width across occipital line 123, least width at base 116; dorsum of head with pale, widely-spaced cross-striae in the area posterior to eyes, the cheeks distinctly serrate; interocellar and postocular setae pale and extremely minute, not accurately measurable in the holotype because nearly invisible, apparently about 9 microns long; dorsum of head with the minor setae disposed as usual in the genus, except that there are only two pairs between postoculars and posterior ocelli. Eyes more than one-half the total length of head, their dorsal length about 54 microns. Ocelli about 13 microns in diameter, the posterior pair 23 apart and 14 from median ocellus. Antennae short and stout, scarcely 2.2 times the length of the short head; segment II not elevated on dorsum near apex and not produced, its setae short (12 microns), pale gray, and very inconspicuous; III slender, about 37 microns long and about 1.7 times as long as wide, its apical setae gray and about 19 microns long, basal portion of its pedicel about 6 microns long, scarcely as broad subapically and not subangulate, its apical portion firmly united to the swollen distal part of the segment itself, its length about 5 microns, its greatest width (at apex) about 11 microns; forked sense-cones on III and IV broadly U-shaped, with short, slightly curved arms, the sense-cone on III situated on dorsal surface and with its axis about 13 microns long. Mouth-cone moderate, its length from base of labrum about 63 microns, its length beyond posterior dorsal margin of head about 77 microns.

Prothorax about 1.3 times as long as head and nearly 1.5 times as wide as long, its surface with faint, pale, widely-spaced cross-striae; major setae unusually short, the antero-



marginals nearly colorless and only 12 microns long, antero-angulars somewhat darker and 15 microns, the others dark gray-brown, outer pair at posterior angles 33, inner pair 37, large submedian pair on posterior margin 27; minor prothoracic setae apparently disposed as usual in the genus. Fore wings about 0.54 mm. long and 40 microns wide at middle, the setae gray-brown, costa with 22-24 (those at middle of wing 26 microns long), anterior vein with a small one at base followed by three successively longer ones and then by 14-15, hind vein with 13-15.

Abdomen of normal form and structure, nearly 1.5 times as broad as prothorax; tergum VIII with the comb on posterior margin complete and regular, its longest microtrichia about 15 microns in length; terga VII-X measuring in length respectively as follows, in microns: 60, 72, 56, 50; X 53 microns in width at base; setae on apical segments dark gray-brown, I on IX 46 microns, II 55, III 56; seta I on X 77, II 60.

Measurements of female (holotype), in mm.: Length about 0.94 (nearly fully distended, 1.04); head, total length 0.091, width across eyes 0.125, least width just behind eyes 0.121, greatest width across cheeks 0.124, width at occipital line 0.123, least width near base 0.116; prothorax, median length of pronotum 0.108, width 0.159; pterothorax, width across anterior angles 0.178, greatest width 0.209; abdomen, greatest width (at segment IV) 0.232.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	21	28	37	32	28	34	6	10
Width (microns):	23	25	22	21	18	17	6	5
Total length of antenna, 0.196 mm.								

TRINIDAD: March 30, 1915, Dr. C. B. Williams, 1 ♀, "swept from low herbage in cacao grove" [Williams No. 630].

This minute pale species is seemingly closely allied to *fulvicornis*, differing from it in having much shorter prothoracic and abdominal setae.

94. *Frankliniella trisetosa*, sp. nov.

Female (macropterous). — Length about 1.1 mm. (fully distended, about 1.4 mm.). Color dark brown, more or less blackish, the abdomen often darker along sides and in last three or four segments; internal pigmentation reddish orange,

ocellar pigmentation dark red; femora about concolorous with body, yellowish apically, the fore pair paler along inner surface; fore tibiae paler than the others, largely yellow, with a brown cloud at middle, the hind tibiae largely brown, the middle pair yellow at either end, the hind pair darker but pale apically and yellow at base; all tarsi yellow; antennae with segments I, II, and VI-VIII about concolorous with head, II sometimes darker than I, III and IV dark golden yellow, the former lightly infusate apically, the latter darker and infusate also at sides, V largely brown but with its slender pedicel yellow; fore wings uniform light brown, not paler subbasally.

Head moderately short, its length a trifle greater than its least basal width and about 0.9 the greatest width across cheeks, the transocular width slightly greater; cheeks slightly convex, converging to eyes and to base, without a postocular subangulation but with a distinct tooth at occipital line and another behind it, the head of holotype measuring as follows in microns: total length 122, width across eyes 139, least width just behind eyes 135, greatest width across cheeks 137, width across occipital line 135, least width at base 117; dorsum of head with pale widely-spaced cross-striae in the area posterior to eyes, the cheeks serrate; interocellar setae pale brown or gray, about 19 microns long and 22 apart, arising between the posterior ocelli on a line with their anterior margins; postocular setae darker than interocellars, about 21 microns long and 107 apart; minor setae disposed as usual in the genus. Eyes more than one-half the total length of head, their dorsal length in holotype 67 microns, dorsal width about 41, dorsal interval approximately 58. Ocelli 12-13 microns in diameter, the posterior pair 31 apart and 18 from median ocellus. Antennae short and stout, scarcely twice the length of head; segment II not elevated on dorsum near apex and not produced, its setae grayish yellow and 23 microns long; III relatively stout and rounded, about 44 microns long and about twice as long as wide, its apical setae gray and about 28 microns long, basal portion of its pedicel about 6 microns long, a little broader subapically than long, and not subangulate, the apical portion of pedicel firmly united to the swollen distal part of the segment itself, its length about 5 microns, its greatest width (at apex) about 12 microns; forked sense-cones on III and IV broadly U-shaped, with short slightly-

curved arms, the sense-cone on III situated on dorsal surface and with its axis about 12 microns long.

Prothorax a trifle shorter than head and nearly 1.4 times as wide as long, its surface with faint, pale, widely-spaced, anastomosing cross-striae; major setae dark brown, antero-marginals of holotype 27 microns long, antero-angulars 38, outer pair at posterior angles 46, inner pair 49, large submedian pair on posterior margin 26; minor prothoracic setae disposed as usual in the genus. Fore wings about 0.74 mm. long and 63 microns wide at middle, the setae light brown. costa of holotype with 26-27 (those at middle of wing 36 microns long), anterior vein with a small one at base followed by three successively longer ones and then by 18-19, posterior vein with 17-18.

Abdomen of normal form and structure, about 1.5 times as broad as prothorax; tergum VIII with the comb on posterior margin complete and regular, its longest microtrichia about 20 microns in length; terga VII-X measuring in microns respectively as follows, in length (in holotype): 76, 74, 50, 81; X 65 microns in width at base; setae on apical segments dark gray-brown, I on IX 45 microns, II 63, III 79; seta I on X 87, II 88.

Measurements of female (holotype), in mm.: Length about 1.13 (fully distended, 1.42); head, total length 0.122, width across eyes 0.139, least width just behind eyes 0.135, greatest width across cheeks 0.137, width at occipital line 0.135, least width at base 0.117; prothorax, median length of pronotum 0.118, width 0.163; pterothorax, width across anterior angles 0.206, greatest width 0.240; abdomen, greatest width (at segment IV) 0.244.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	23	37	44	40	31	42	8	12
Width (microns):	27	25	23	22	20	20	7	6
Total length of antenna, 0.237 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, May 25 to June 4, 1936, Felix Woytkowski, 26 ♀♀, from flowers of *Liabum verbascifolia* (HBK.) Less. (holotype from this plant), *Pappobolus macranthus* Blake, *Senecio* sp., and an unidentified bush (all determinations by Dr. Paul C. Standley).

This little species is related to *oxyura*, but differs conspicuously in having three pairs of minute cephalic setae between the postoculars and the posterior ocelli, instead of two pairs.

95. *Frankliniella maculipes*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (fully distended, 1.6 mm.). Color dark brown, more or less blackish, especially in the abdomen, which is usually blackish brown, the head darkened laterally and usually lighter and more yellowish medially; internal pigmentation reddish orange, ocellar pigmentation dark red; femora about concolorous with body, more or less yellowish apically (especially the anterior pair), the anterior pair paler than the others and nearly yellow along inner surface; fore tibiae paler than the others, largely yellow, with an indistinct light brown cloud at middle, the intermediate and hind pairs also largely yellow, with a heavier brown cloud at middle, that on hind tibiae dark blackish brown, all of these spots largely confined to the morphologically upper surface; all tarsi yellow; antennae with segments I, II, and VI-VIII about concolorous with head, II darker than I and rich chestnut-brown, basal three-fifths of III, basal half of IV, and often the basal third of V, bright yellow, III distinctly infusate apically, IV and V dark gray-brown apically, the latter segment often wholly dark save for a small subbasal yellowish area; fore wings uniform light brown, not paler subbasally.

Head moderately long, its length about 1.1 times its least basal width and not quite equal to the greatest width across cheeks, the transocular width slightly greater; cheeks only slightly convex, converging to eyes and to base, without a postocular subangulation but with a distinct tooth at occipital line and another behind it, the head of holotype measuring as follows in microns: total length 136, width across eyes 145, least width just behind eyes 140, greatest width across cheeks 142, width across occipital line 139, least width near base 123; dorsum of head with widely-spaced cross-striae in the area posterior to eyes, the cheeks slightly serrate; interocellar setae dark gray-brown, about 28 microns long and 22 apart, arising between the posterior ocelli, slightly in advance of their anterior margins; postocular setae dark like interocellars, about 27 microns long and 110 apart; minor setae disposed as usual in the genus, except that there are

only two pairs between postoculars and the posterior ocelli. Eyes more than one-half the total length of head, their dorsal length in holotype 75 microns, dorsal width about 43, dorsal interval approximately 60. Ocelli 14-15 microns in diameter, the posterior pair 33 apart and 21 from median ocellus. Antennae moderately short, about twice the length of head; segment II not elevated on dorsum near apex and not produced, its setae dark gray-brown and 28 microns long; III relatively stout and rounded, about 50 microns long and more than twice as long as wide, its apical setae gray and about 29 microns long, basal portion of its pedicel about 7 microns long, a little narrower subapically than long, and not subangulate, the apical portion of pedicel firmly united to the swollen distal part of the segment itself, its length about 6 microns, its greatest width (at apex) about 12 microns; forked sense-cones on III and IV broadly U-shaped, with short, slightly-curved arms, the sense cone on III situated on dorsal surface and with its axis about 16 microns long.

Prothorax about equal in length to head and about 1.3 times as wide as long, its surface with faint, pale widely-spaced, anastomosing cross-striae; major setae dark brown, antero-marginals of holotype 39 microns long, antero-angulars 59, outer pair at posterior angles 58, inner pair 66, large submedian pair on posterior margin 33; minor prothoracic setae disposed as usual in the genus. Fore wings about 0.882 mm. long and 58 microns wide at middle, the setae light brown, costa of holotype with 26-28 (those at middle of wing 44 microns long), anterior vein with a small one at base followed by three successively longer ones and then by 17, posterior vein with 16-17.

Abdomen of normal form and structure, about 1.5 times as broad as prothorax; tergum VIII with the comb on posterior margin complete and regular, its longest microtrichia about 26 microns in length; terga VII-X measuring in length, in holotype, respectively as follows, in microns: 90, 93, 79, 73; X 68 microns in width at base; setae on apical segments dark blackish brown, I on IX 79 microns, II 99, III 114; seta I on X 118, II 114.

Measurements of female (holotype), in mm.: Length about 1.32 (fully distended, 1.61); head, total length 0.136; width across eyes 0.145, least width just behind eyes 0.140, greatest width across cheeks 0.142, width at occipital line

0.139, least width at base 0.123; prothorax, median length of pronotum 0.134, width 0.172; pterothorax, width across anterior angles 0.211, greatest width 0.248; abdomen, greatest width (at segment IV) 0.265.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	26	40	50	45	39	47	8	14
Width (microns):	28	26	23	22	18	19	8	7
Total length of antenna, 0.269 mm.								

Male (macropterous). — Color of body and legs yellow, the abdomen more or less distinctly shaded with light brown, especially in the last two segments, the femora and tibiae lightly marked with brown on outer surface at middle; antennae largely yellow, segment II usually somewhat darker than I, lightly shaded with gray, and with orange internal pigmentation at apex, III-V successively darker, III yellow but lightly shaded with gray apically, IV and V yellow in about basal half, VI-VIII dark gray-brown, VI paler in about basal third, its remainder concolorous with apex of V; fore wings light brown, not paler subbasally.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area close behind the antecostal suture, that on sternum IV of allotype 36  $\times$  17 microns; tergum IX with the three pairs of central setae brownish yellow and arising as usual from low tubercles, the median pair of one paratype 29 microns long, about 2 microns in diameter near base, and 10-11 apart, shorter than the lateral pair but equal in diameter to them, this pair about 42 microns long, 54 apart, and arising on the same transverse line, the third pair about 12 microns long and 31 apart, arising 5-7 microns behind the line of first pair of setae, the usual pores with their centers about 26 microns apart and situated about on a line with the first pair of setae; segment IX with the more posterior pair of setae about 3 microns in diameter and 75 long, the other pair much slenderer and shorter, 40 microns long; X with its upper pair of major setae stouter than the more posterior pair on IX and 98 microns long, the lower pair more slender and 84 microns long.

Measurements of male (allotype), in mm.: Length about 1.08 (fully distended, 1.26); head, total median length 0.127, width across eyes 0.134, least width just behind eyes

0.127, greatest width across cheeks 0.128, width at occipital line 0.124, least width near base 0.109; postocular setae, length 0.031, interval 0.100; interocellar setae, length 0.029, interval 0.019; prothorax, median length of pronotum 0.120, width 0.152; antero-marginal setae, length 0.041, antero-angulars 0.051, outer pair at posterior angles 0.050, inner pair 0.060, large submedian pair on posterior margin 0.037; pterothorax, width across anterior angles 0.185, greatest width 0.214; fore wings, length 0.714, width at middle 0.053, length of costal setae at middle of wing 0.038; abdomen, greatest width (at segment IV) 0.172.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	23	36	43	37	32	41	7	12
Width (microns):	25	23	20	19	18	18	8	6
Total length of antenna, 0.231 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, June 3, 1936, Felix Woytkowski, 17 ♀♀ and 4 ♂♂, from flowers of a composite [Hood No. 1194].

Related to *ovipara*, but with the antennae slenderer, the tenth abdominal segment shorter, all setae longer, and the coloration darker.

96. *Frankliniella compositarum*, sp. nov.

Female (macropterous). — Length about 1.5 mm. (fully distended, about 1.8 mm.). Color dark brown, more or less blackish, especially in the abdomen, which is usually blackish brown; internal pigmentation reddish orange, ocellar pigmentation dark red; legs about concolorous with body, the fore tibiae and all tarsi yellow but clouded with brown, the trochanters and knees often paler, the fore femora not paler along inner surface; antennae with segments I, II, and V-VIII about concolorous with head, II darker than I and rich chestnut-brown, basal portion of pedicel of III pale yellow, remainder of segment (except the usual clear subbasal band) brownish yellow and heavily shaded with dark gray or brown along sides and apically, IV darker than III, brownish yellow in about basal half and darkened with blackish brown laterally and apically, V often with a small subbasal yellowish area; wings uniform light brown, not paler subbasally.

Head moderately short, its length scarcely 1.1 times its least basal width and 0.9 the greatest width across cheeks, the trans-ocular with slightly greater; cheeks only slightly

convex, converging to eyes and to base, without a distinct postocular subangulation but with a tooth at occipital line and two behind it, the head of holotype measuring as follows in microns: total length 147, width across eyes 167, least width just behind eyes 161, greatest width across cheeks 163, width across occipital line 155, least width near base 137; dorsum of head with widely-spaced cross-striae in the area posterior to eyes, the cheeks serrate; interocellar setae blackish brown, about 30 microns long in holotype, arising behind the line of front margin of posterior ocelli, and only 17 microns apart; postoculars prominent, about 34 microns long and thus much less than one-half the length of eyes, their interval about 124 microns; head with all minor setae disposed as usual in the genus. Eyes much more than one-half the length of head, their dorsal length in holotype 85 microns, dorsal width about 50, least dorsal interval approximately 66. Ocelli 16-18 microns in diameter, the posterior pair 33 apart and 22 from median ocellus. Antennae moderately slender but less than twice the length of head; segment III 55 microns long in holotype and about 2.3 times as long as wide, basal portion of its pedicel about 7 microns long and broadened in apical half or more, the greatest width (nearly 10 microns) across a slight shelf at extreme apex, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened pale ring, its length about 6 microns, greatest width (at apex) about 14 microns, its sides convexly converging posteriorly; forked sense-cones on III and IV broadly U-shaped, moderately short, that on III with axis about 21 microns long; dorsal pair of setae on II and III about 34 and 35 microns long, respectively.

Prothorax about equal in length to head, its width fully 1.3 times its length, with a few shallow transverse corrugations near posterior margin, with several widely-spaced dark cross-striae near anterior margin, and with a few pale striae in median portion of disk; major setae nearly black, moderately stout, finely pointed at tip, measuring as follows in microns in holotype: antero-marginals 42, antero-angulars 63, outer pair at posterior angles 76, inner 82, large submedian pair on posterior margin 45; minor prothoracic setae normal in form, number, and arrangement. Fore wings about 0.92 mm. long, 68 microns broad at middle, costa of



holotype with 28 short stout setae (those at middle of wing 58 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 21-22, posterior vein with 18-20.

Abdomen of normal form and structure, about 1.6 times as broad as prothorax; tergum VIII with comb on posterior margin complete, close and regular, the longest individual microtrichia about 20 microns in length; terga VII-X of holotype measuring respectively as follows, in microns: 93, 97, 75, 75; X almost completely divided, 78 microns wide at base; seta I on IX of holotype 93-104 microns, II 126, III 134; seta I on X 126, II 126.

Measurements of female (holotype), in mm.: Length about 1.46 (fully distended, 1.77); head, total median length 0.147, width across eyes 0.167, least width just behind eyes 0.161, greatest width across checks 0.163, width across occipital line 0.155, least width at base 0.137; prothorax, median length of pronotum 0.147, width 0.195; pterothorax, width across anterior angles 0.246, greatest width 0.290; abdomen, greatest width (at segment IV) 0.315.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	25	44	55	47	38	50	9	14
Width (microns):	30	29	24	23	20	20	8	6
Total length of antenna, 0.282 mm.								

Male (macropterous). — Color of body and legs orange-yellow, brightest in thorax because of the dense internal pigmentation, the abdomen brownish in last two segments, the legs with a brown cloud on the morphologically upper surfaces of all femora and tibiae, at middle; ocellar pigmentation dark red; antennae largely yellow, segment I palest, II darker because of orange pigmentation at apex, III-V yellow in basal four-fifths, three fifths, and one-half, respectively, their remainder and all of VI-VIII gray-brown, VI sometimes paler in basal half or with a very narrow subbasal pale ring.

Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area close behind the antecostal suture, that on IV of allotype  $50 \times 14$  microns; tergum IX with the three pairs of central setae brownish yellow and arising as usual from low tubercles, the median pair 27-28 microns long in one paratype, 3 microns in diameter near base, and 20 apart, much shorter than the lateral pair but equal in

diameter to them, this pair about 37 microns long and 71 apart, arising about 6 microns posteriorly, the third pair minute (about 12 microns long and 44 apart), situated 10 microns behind the first pair, the usual pores with their centers 47 microns apart and situated about on a line with the first pair of setae; segment IX with the dorso-lateral setae dark brown and less than 4 microns in diameter, 71 long, the other pair more slender and 44 microns long; X with its upper pair of major setae about as stout as the more posterior pair on IX and 99 microns long, the lower pair more slender and 80 microns long.

Measurements of male (allotype), in mm.: Length about 1.12 (fully distended, 1.24); head, total median length 0.123, width across eyes 0.149, least width just behind eyes 0.140, greatest width across cheeks 0.144, width at occipital line 0.137, least width at base 0.122; eyes, dorsal length 0.068; postocular setae, length 0.023, interval 0.110; interocellar setae, length 0.029, interval 0.015; prothorax, median length of pronotum 0.126, width 0.165; antero-marginal setae, length 0.035, antero-angulars 0.046, outer pair at posterior angles 0.053, inner pair 0.053, large submedian pair on posterior margin 0.033; pterothorax, width across anterior angles 0.191, greatest width 0.228; fore wings, length 0.71, width at middle 0.051, length of costal setae at middle of wing 0.044; abdomen, greatest width (at segment IV) 0.193.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	23	40	45	41	35	46	7	13
Width (microns):	26	25	22	20	18	19	8	6
Total length of antenna, 0.250 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, June 4, 1936, Felix Woytkowski, 11 ♀♀ and 4 ♂♂, in flowers of *Senecio* (determination by Dr. Paul C. Standley) [Hood No. 1190].

This species is allied to *trisetosa*, but differs in its larger size, darker legs, slenderer antennae, and longer setae.

#### 97. *Frankliniella alonsoae*, sp. nov.

Female (macropterous). — Length about 1.6 mm. (fully distended, about 2.0 mm.). Color nearly uniform blackish brown; legs concolorous with body, except that the fore tibiae and tarsi are paler and yellowish brown, and the middle and hind tarsi dark brown; antennae with segments I, II, and IV-

VIII dark brown or blackish brown, II paler in median portion at apex, III yellow in basal third and rapidly shading to blackish brown in apical half, IV and V indistinctly paler sub-basally; fore wings with scale and apical three-fourths very dark brown, the intervening portion light brown.

Head moderately long, its length when horizontal fully 0.9 the greatest width (which is across eyes) and more than 1.1 times the least width at base, the latter with the usual dark submarginal apodeme of equal width throughout; cheeks broadest across a slight subangulation behind eyes, thence straight or slightly concave and converging to the occipital line, where the head is slightly widened again and from whence its cheeks converge roundly to the short, parallel-sided basal collar, the head of holotype measuring as follows in microns: total length 163, width across eyes 172, least width just behind eyes 166, greatest width across cheeks 170, width across angulation formed by occipital line 166, least width at base 145; dorsum of head cross-striate in the entire area posterior to ocelli, those striae in front of occipital line closer together and indistinct, those behind it more widely spaced and nearly black, all or most of them producing a distinct serration in the cheeks; interocellar setae long (66 microns in holotype), strong, situated in advance of the line of front margins of posterior ocelli, and 25 microns apart; postoculars prominent, about 43 microns long and thus about one-half the length of eyes, their interval about 133 microns; head with all minor setae disposed as usual in the genus. Eyes somewhat more than one-half the length of head, their dorsal length in holotype 89 microns, dorsal width about 48, least dorsal interval approximately 77. Ocelli 18-19 microns in diameter, the posterior pair 37 apart and 25 from median ocellus. Antennae slender, little more than twice the length of head; segment III 67 microns long in holotype and about 2.6 times as long as wide, basal portion of its pedicel about 10 microns long and broadened in apical half or more, the greatest width (about 11 microns) across a slight shelf at extreme apex, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened paler ring, its length about 6 microns, its greatest width (at apex) about 14, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, that on III with axis about 19 microns

long; dorsal pair of setae on II and III about 44 and 49 microns long, respectively.

Prothorax about equal in length to head, its width nearly 1.3 times its length, with a few shallow transverse corrugations near posterior margin and about two striae near anterior margin, the remainder of its surface smooth; major setae nearly black, long, and prominent, measuring as follows in microns in holotype: antero-marginals 103, antero-angulars 110, outer pair at posterior angles 123, inner 106, large submedian pair on posterior margin 50-56; minor prothoracic setae slender, small, and inconspicuous, normal in number and arrangement, except that normally there are two pairs between the antero-marginals. Fore wings about 1.1 mm. long and 90 microns broad at middle, costa of holotype with 26-27 long dark brown setae (those at middle of wing 81 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 19-20, posterior vein with 18-21.

Abdomen of normal form and structure, fully 1.6 times as broad as prothorax, terga sparsely transversely striate; tergum VIII with comb on posterior margin complete, close, and regular, the longest individual microtrichia about 24 microns; terga VII-X of holotype measuring respectively as follows, in microns: 111, 105, 74, 74; X about 77 wide at base and almost completely divided; seta I on IX of holotype 110 microns, II 130, III 150; seta I on X 148, II 134.

Measurements of female (holotype), in mm.: Length about 1.62 (fully distended, 1.96); head, total median length 0.163, width across eyes 0.172, least width just behind eyes 0.166, greatest width across cheeks 0.170, width across occipital line 0.166, least width at base 0.145; prothorax, median length of pronotum 0.165, width 0.210; pterothorax, width across anterior angles 0.274, greatest width 0.325; abdomen, greatest width (at segment IV) 0.353.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	33	50	67	55	49	51	11	21
Width (microns):	36	30	26	26	23	23	10	7
Total length of antenna, 0.337 mm.								

Male (macropterous). — Color virtually identical with that of female, though slightly paler, especially in all parts of the fore wings. Structure much as in female; sterna III-VII each with a transverse subelliptical glandular area adjacent

to the antecostal suture, most of these areas narrowed at middle, that on IV of allotype about 89 microns in width, 14 in length medially, and 19 in length laterally; tergum IX with the three pairs of central setae arising as usual from low tubercles, the median pair 29-33 microns long in one paratype, more than 3 microns in diameter near base, and 12 apart, the lateral pair larger, 49 microns long, 4 in diameter, 72 apart, and arising 10-11 microns anteriorly, the third pair paler and much smaller, 18 microns long, about 37 apart, and situated about 7 microns behind the first pair, the usual pair of pores with their centers 46 microns apart and on a line with the second pair of setae; segment IX with the posterior pair of dorso-lateral setae nearly 5 microns in diameter and 92 long, the other pair scarcely as stout and 62 microns long: X with its upper pair of major setae about as stout as the more posterior pair on IX and 107 microns long, the lower pair more slender and about 105 microns long.

Measurements of male (allotype), in mm.: Length about 1.36 (fully distended, 1.58); head, total median length 0.151, width across eyes 0.157, least width just behind eyes 0.148, greatest width across cheeks 0.150, width at occipital line 0.140, least width near base 0.126; postocular setae, length 0.040, interval 0.119; interocellar setae, length 0.058, interval 0.022; prothorax, median length of pronotum 0.136, width 0.178; antero-marginal setae, length 0.075, antero-angulars 0.076, outer pair at posterior angles 0.079, inner pair 0.074, large submedian pair on posterior margin 0.043; pterothorax, width across anterior angles 0.221, greatest width 0.262; abdomen, greatest width (at segment III) 0.239.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	27	42	56	47	39	48	9	17
Width (microns):	31	27	24	23	21	21	10	6
Total length of antenna, 0.285 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, June 2, 1936, Felix Woytkowski, 9 ♀♀ and 5 ♂♂, from flowers of *Alonsoa acutifolia* R. and P. (determination by Dr. Paul C. Standley) [Hood No. 1195].

This is a member of the *insularis* series and is apparently closely related to *argentinae*. The longer head, darker wings, and the greater number of setae on the wings are the principal differentiating characters of *alonsoae*.

98. *Frankliniella nubilicornis*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (fully distended, about 1.6 mm.). Color nearly uniform pale yellow, deepest in head and thorax because of dense internal pigmentation, the legs concolorous with body; antennae with segment I palest and whitish yellow, II grayish yellow, shaded laterally with darker gray, and with orange internal pigmentation at apex, III grayish yellow, lightly shaded with gray just beyond the pale subbasal ring and again in about apical fourth, which is darkest, IV and V grayish yellow in basal half, dark gray in apical half, pedicel of V abruptly darkened, VI-VIII dark gray; fore wings very pale yellowish brown.

Head moderately long, its length when horizontal about 0.9 the greatest width (which is across eyes) and nearly 1.1 times the least width at base, the latter with the usual submarginal apodeme not darkened; cheeks broadest across a slight subangulation behind eyes, thence slightly convex and converging to the occipital line, where the head is slightly widened again and from whence its cheeks converge roundly to the short, parallel-sided basal collar, the head of holotype measuring as follows in microns: total length 133, width across eyes 149, least width just behind eyes 142, greatest width across cheeks 148, width across angulation formed by occipital line 147, least width at base 126; dorsum of head with pale cross-striae in the entire area posterior to ocelli, those striae in front of occipital line closer together and indistinct, those behind it more widely spaced, a few of them producing a slight serration in the cheeks; interocellar setae dark brown, long (50 microns in holotype), situated a trifle in advance of the line of front margins of posterior ocelli, and 23 microns apart; postoculars prominent, dark brown, about 36 microns in length and thus about one-half as long as eyes, their interval about 113 microns; head with all minor setae disposed as usual in the genus. Eyes decidedly more than one-half the length of head, their dorsal length in holotype 73 microns, dorsal width about 41, least dorsal interval approximately 67. Ocelli 12-13 microns in diameter, the posterior pair 37 apart and 21 from median ocellus. Antennae slender, more than 2.2 times the length of head; segment III 57 microns long in holotype and less than 2.4

times as long as wide, basal portion of its pedicel fully 7 microns long, broadest at apical third across a sharp angulation where the width is 8 microns, sides of apical third concavely converging to apex, apical portion of pedicel closely connected with the broadened remainder of segment, its basal half forming a weakened colorless ring, its length about 5 microns, its greatest width (at apex) about 12, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, broadly U-shaped, that on III with axis about 19 microns long; dorsal pair of setae on II and III about 33 and 36 microns long, respectively.

Prothorax shorter than head, its width nearly 1.4 times its length, with a few shallow transverse corrugations near posterior margin and about two striae near anterior margin, the remainder of its surface smooth; major setae dark brown, long, and prominent, measuring as follows in microns in holotype: antero-marginals 70, antero-angulars 68, outer pair at posterior angles 82, inner 75, large submedian pair on posterior margin 50; minor prothoracic setae distinct and rather long, normal in number and arrangement. Fore wings about 0.9 mm. long and 63 microns broad at middle, costa of holotype with 28 long yellowish gray setae (those at middle of wing 58 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 19, posterior vein with 20-21.

Abdomen of normal form and structure, fully 1.4 times as broad as prothorax, terga nearly smooth; tergum VIII with comb on posterior margin complete, the longest individual microtrichia about 18 microns; tergum X about 74 microns long and 64 wide at base, divided in apical three-fourths; apical abdominal setae uniform dark brown or blackish brown, those on IX about 4 microns in diameter near base, seta I on IX of holotype 70 microns, II 100, III 113; seta I on X 122, II 112.

Measurements of female (holotype), in mm.: Length about 1.33 (fully distended, 1.55); head, total median length 0.133, width across eyes 0.149, least width just behind eyes 0.142, greatest width across cheeks 0.148, width across occipital line 0.147, least width at base 0.126; prothorax, median length of pronotum 0.124, width 0.172; pterothorax, width across anterior angles 0.209, greatest width 0.246; abdomen, greatest width (at segment IV) 0.248.





PERU: vicinity of Celendin, Dept. Cajamarca, May 28, 1936, Felix Woytkowski, 15 ♀♀ and 6 ♂♂, from flowers of *Polygonum* sp. (determination by Dr. Paul C. Standley) [Hood No. 1183].

This species is close to *difficilis*, but differs in having the dorsal setae on the ninth abdominal segment much shorter than the lateral pairs, in the much darker antennal coloration, and in the form of the basal portion of the pedicel of the third antennal segment.

99. *Frankliniella inca*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (partially distended, about 1.4 mm.). Color nearly uniform pale yellow, deepest in head and thorax because of dense internal pigmentation, the legs concolorous with or slightly paler than body; antennae with segments I and II whitish yellow and palest, II narrowly and very lightly shaded with gray at sides and with orange internal pigmentation at apex, III whitish yellow in basal three-fifths and shading to gray in about apical fourth, IV grayish yellow in basal half, rather abruptly dark gray-brown in apical half, V whitish yellow, narrowly brown across apex and in pedicel, VI-VIII dark gray-brown; fore wings very pale brownish yellow.

Head rather short, its length when horizontal about 0.85 the greatest width (which is across eyes) and equal to the least width at base, the latter with the usual submarginal apodeme not darkened; cheeks broadest but scarcely subangulate shortly behind eyes, thence slightly convex and converging to the occipital line, where the head is slightly widened again and from whence its cheeks converge almost straightly to the short parallel-sided basal collar, the head of holotype measuring as follows in microns: total length 121, width across eyes 144, least width just behind eyes 137, greatest width across cheeks 142, width across angulation formed by occipital line 138, least width near base 121; dorsum of head with pale cross-striae in the entire area posterior to ocelli, those striae in front occipital line closer together and more indistinct, those behind it more widely spaced, a few of them producing a slight serration in the cheeks; interocellar setae brownish yellow, long (46 microns in holotype), situated a trifle in advance of the line of front margins of posterior ocelli, and 25 microns apart; postoculars brownish yellow, about 29 microns in length and thus scarcely one-half as

long as eyes, their interval about 106 microns; head with all minor setae disposed as usual in the genus. Eyes decidedly more than one-half the length of head, their dorsal length in holotype 67 microns, dorsal width about 43, least dorsal interval approximately 59. Ocelli 14-15 microns in diameter, the posterior pair 38 apart and 19 from median ocellus. Antennae slender, more than 2.2 times the length of head; segment III 52 microns long in holotype and about 2.6 times as long as wide, basal portion of its pedicel scarcely 7 microns long, broadest at apical third across a sharp angulation where the width is 8 microns, sides of apical third convexly converging to apex, apical portion of pedicel closely connected with the broadened remainder of segment, its basal half forming a weakened colorless ring, its length about 5 microns, its greatest width (at apex) about 40, its sides convexly converging posteriorly; forked sense-cones on III and IV moderately short, broadly U-shaped, that on III with axis about 15 microns long; dorsal pair of setae on II and III about 27 and 32 microns long, respectively.

Prothorax equal in length to head, its width about 1.36 times its length, its surface nearly smooth; major setae pale yellowish brown, long and prominent, measuring as follows in microns in holotype: antero-marginals 68, antero-angulars 59, outer pair at posterior angles 66, inner 60, large submedian pair on posterior margin 43; minor prothoracic setae distinct and rather long, normal in number and arrangements. Fore wings about 0.8 mm. long and 55 microns broad at middle, costa of holotype with 26 long pale grayish yellow setae (those at middle of wing 53 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 17-18, posterior vein with 16-18.

Abdomen of normal form and structure, fully 1.5 times as broad as prothorax, terga nearly smooth; tergum VIII with comb on posterior margin complete, the longest individual microtrichia about 17 microns; tergum X about 77 microns long and 61 wide at base, divided in apical three-fourths; apical abdominal setae pale grayish yellow, those on IX about 3 microns in diameter near base, seta I on IX of holotype 74 microns, II 84, III 103; seta I on X 101, II 90.

Measurements of female (holotype), in mm.: Length about 1.30 (partially distended, 1.44); head, total median length

0.121, width across eyes 0.144, least width just behind eyes 0.137, greatest width across cheeks 0.142, width across occipital line 0.138, least width at base 0.121; prothorax, median length of pronotum 0.123, width 0.167; pterothorax, width across anterior angles 0.206, greatest width 0.244; abdomen, greatest width (at segment IV) 0.260.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	24	43	52	46	37	46	7	12
Width (microns):	28	23	20	20	19	19	8	6
Total length of antenna, 0.267 mm.								

Male (macropterous). — Color virtually identical with that of female, though the antennae are somewhat paler, segment VI paler basally. Structure much as in female; sterna III-VII each with a transverse elliptical glandular area close behind the antecostal suture, that on IV of allotype about 16 microns in width and 10 in length; tergum IX with the three pairs of central setae yellow and arising as usual from low tubercles, the median pair largest, 26 microns long, less than 3 microns in diameter near base, and 10 apart, the lateral pair slenderer, about 13 microns long, 42 apart, and arising about 6 microns anteriorly, the third pair much smaller, 9-10 microns long, about 26 apart, and situated about 7 microns behind the first pair, the usual pores with their centers 27 microns apart and midway between the first and second pairs of setae; segment IX with the posterior pair of dorso-lateral setae grayish yellow, about 3 microns in diameter, and 60 long, the other pair scarcely as stout and 40 microns long; X with its upper pair of major setae grayish yellow, about as stout as the more posterior pair on IX, and 81 microns long, the lower pair more slender and also 81 microns long.

Measurements of male (allotype), in mm.: Length about 0.92 (fully distended, 1.04); head, total median length 0.104, width across eyes 0.130, least width just behind eyes 0.123, greatest width across cheeks 0.125, width at occipital line 0.121, least width near base 0.105; postocular setae, length 0.027, interval 0.097; interocellar setae, length 0.043, interval 0.022; prothorax, median length of pronotum 0.104, width 0.142; antero-marginal setae, length 0.065, antero-angulars 0.063, outer pair at posterior angles 0.060, inner pair 0.063, large submedian pair on posterior margin 0.040; pterothorax, width across anterior angles 0.160, greatest width 0.197.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	23	36	47	40	34	45	6	11
Width (microns):	26	23	19	18	16	17	8	6
Total length of antenna, 0.242 mm.								

PERU: vicinity of Celendin, Dept. Cajamarca, May 25 to June 6, 1936, Felix Woytkowskii, 20 ♀♀ and 1 ♂, from various flowers.

Closely allied to *difficilis*, but with the major setae on the apical abdominal segments of both sexes much paler, shorter, and more slender.

100. *Frankliniella borinquen*, sp. nov.

Female (macropterous). — Length about 1.3 mm. (fully distended, about 1.5 mm.). Color nearly uniform pale yellow, deepest in pterothorax because of dense internal pigmentation; ocellar pigmentation orange-red; legs about concolorous with or slightly paler than body; antennae with segment I uniform whitish yellow, II whitish yellow in basal half and medially, lightly shaded with brown at sides, and with orange pigmentation in apex, III pale yellow in about basal three-fourths, its remainder shaded with light gray-brown, its pedicel just perceptibly darkened with brown at sides, IV pale yellow in about basal half and gray-brown in remainder, darker apically than III, V brown in the very brief pedicel and slightly brownish along sides and at extreme tip, VI yellowish brown at base, its remainder and all of VII and VIII gray-brown; fore wings uniform pale yellow, with orange pigmentation in veins.

Head moderately short, its length a trifle less than its least basal width and 0.85 the greatest width across cheeks, which is equal to the width across eyes; cheeks evenly convex, curving to eyes and to base, their curvature interrupted only by a slight tooth at occipital line and another behind it, the head measuring as follows in microns in holotype: total length 130, width across eyes 153, least width just behind eyes 149, greatest width across cheeks 153, width across occipital line 149, least width near base 134; dorsum of head with widely-spaced faint cross-striae in the area posterior to eyes, the cheeks not serrate in front of occipital line; interocellar setae dark brownish gray, about 43 microns long in holotype, 27 microns apart, a little closer together than posterior ocelli, and somewhat closer to the latter than to median ocellus;

postoculars prominent, dark, about 29 microns long and thus much less than one-half the length of eyes, their interval about 122 microns; head with all minor setae disposed as usual in the genus. Eyes much more than one-half the length of head, their dorsal interval in holotype 74 microns. Ocelli 14-15 microns in diameter, the posterior pair 32 apart and 20 from median ocellus. Antennae moderately slender and just twice the length of head, segment II conspicuously elevated and produced on dorsum at apex; segment III 59 microns long in holotype and 2.8 times as long as wide, basal portion of its pedicel about 10 microns long and broadened at middle to form a shelf-like angulation which is about 11 microns across, the part distal to the shelf about 5 microns long, slightly convex, and nearly parallel-sided, apical portion of pedicel closely connected with the broadened remainder of segment, separated from basal portion of pedicel by a weakened pale ring, its length about 11 microns, greatest width (at apex) about 15 microns, its sides concavely converging posteriorly; forked sense-cones on III and IV broadly U-shaped, moderately short, that on III with axis about 19 microns long; dorsal pair of setae on II and III dark gray-brown, the former pair stouter, 3 microns in diameter and 28 long, the latter pair also 28 microns long.

Prothorax about equal in length to head, its width fully 1.3 times its length, its surface nearly smooth; major setae dark gray-brown, moderately stout, measuring as follows in microns in holotype: antero-marginals 45, antero-angulars 50, outer pair at posterior angles 46, inner 62, large submedian pair on posterior margin 36; minor prothoracic setae normal in form, number, and arrangement, yellowish gray in color. Fore wings about 0.63 mm. long, 49 microns broad at middle, costa of holotype with 22-24 short stout setae (those at middle of wing 38 microns in length), anterior vein with one minute seta at base followed by three successively longer ones and then by 17, posterior vein with 13-15.

Abdomen of normal form and structure, about 1.5 times as broad as prothorax; tergum VIII with comb on posterior margin complete and regular, but sparse, the longest individual microtrichia about 13 microns; seta I on IX of holotype 92 microns, II 101, III 93; seta I on X 116, II 102.

Measurements of female (holotype), in mm.: Length about 1.30 (fully distended, 1.49); head, total median length

0.130, width across eyes 0.153, least width just behind eyes 0.149, greatest width across cheeks 0.153, width across occipital line 0.149, least width at base 0.134; prothorax, median length of pronotum 0.135, width 0.181; pterothorax, width across anterior angles 0.217, greatest width 0.244; abdomen, greatest width (at segment IV) 0.274.

Antennal segments:	1	2	3	4	5	6	7	8
Length (microns):	25	37	59	44	33	44	7	11
Width (microns):	28	23	21	21	18	19	8	6
Total length of antenna, 0.260 mm.								

PUERTO RICO: Rio Piedras, May 15, 1940, Dr. James G. Needham, 3 ♀♀, in flowers of *Bidens*.

This species is very close to *cubensis*, but differs in the form of the pedicel of the third antennal segment.

### Addendum

*Lactinothrips modestus* Hood. -- This species was described in Part II of the present paper (Vol. 12, p. 230) from two specimens which were designated as the holotype and paratype, respectively; and the statement was made at the top of page 233 that the data for the paratype were not yet available, but would be given at the end of this series of papers. These data are as follows: PERT: Tingo Maria, Dept. Huanuco, May 10-12, 1937, Felix Woytkowski, 1 ♂, «from dead branches and leaves, 800 m. elevation [Hood No. 1421]

### Acknowledgment

The preparation and labeling of the numerous slides upon which these papers are based, and the furthering of those other routine tasks which are an inevitable part of taxonomic investigation, were made possible by generous grants-in-aid given during the academic years 1940-41 and 1941-42 by the Trustee-Faculty Committee on Research at Cornell University. Thus all of the preceding pages of this series of papers, with the exception only of the first forty-four, are directly attributable to these grants, though they represent only those results which were deemed worthy of immediate publication.

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## PEQUENAS COMUNICAÇÕES

Revista Brasileira de Biologia

Registramos com prazer o aparecimento de mais uma revista especializada no Brasil, que se destina a servir aos numerosos biólogos cujas atividades se concentram na pesquisa científica nos vários ramos em que se divide a Ciência da Vida. A nova publicação, que devemos ao espírito empreendedor do jovem pesquisador brasileiro Dr. Herman Lent, começou a circular em março deste ano. A revista é trimestral. Até hoje apareceram tres fascículos, com um total de 364 páginas. A assinatura anual para o Brasil é de 50\$000 rs.; e para o estrangeiro de \$4.00 U.S. Toda a correspondência deve ser dirigida ao Dr. H. Lent, Caixa Postal 1.587, Rio de Janeiro.

O primeiro número traz o seguinte comentário sobre o aparecimento do novo periódico: «O estado atual das relações entre os homens dificultou e, em alguns casos, impediu que continuassem as comunicações entre a America e a Europa e, assim, a Sociedade de Biologia do Brasil, filiada à «Société de Biologie de Paris» e cujos trabalhos eram publicados nos «Compte Rendus», viu-se impossibilitada de divulgar os assuntos apresentados em sessão por seus associados. Daí a idéia desta Revista que, já então, poderia tomar o aspeto com que se apresenta, aceitando colaboração estranha ao quadro associativo da Sociedade de Biologia do Brasil. Ao mesmo tempo, a Sociedade tratou de incluir os biólogos do Brasil em sua organização, procurando estimular a criação de novas seções nos vários Estados da União que filiariam ao organismo central, do qual a *Revista Brasileira de Biologia* é o órgão oficial. Entretanto, não são reduzidas as dificuldades que se apresentam a uma obra deste tipo, cujos fundamentos foram lançados pela atual diretoria da Sociedade de Biologia do Brasil, que viu seus esforços e sua solicitação compreendidos por um grupo selecionado de pesquisadores e teve o apoio material indispensavel de um homem que já se tornou credor da gratidão dos que se dedicam à Ciência no Brasil, o Dr. Guilherme Guinle, cujo nome a *Revista Brasileira de Biologia* ostenta com orgulho em sua capa.»

A nova Revista tem caracter internacional, publicando trabalhos em portugues, espanhol, ingles, frances, alemão e italiano. Os trabalhos devem ser submetidos ao julgamento do



Conselho Científico, de que fazem parte nomes de projeção universal como Arthur Neiva, Lauro Travassos, Miguel Ozorio de Almeida, etc.

### Professor Hering e a «Revista de Entomologia»

O Prof. Dr. E. M. Hering, do Museu Zoológico de Berlim, acaba de publicar um artigo em «Deutsche Entomologische Zeitschrift» (1941, p. 112), intitulado «Revista de Entomologia», em que diz o seguinte:

In diesem Jahre ist die führende südamerikanische Zeitschrift für Entomologie in ihren 11. Jahrgang eingetreten. Wir haben mit grösstem Interesse die Entwicklung unserer Schwesterzeitschrift verfolgt, zumal auch viele unserer Mitglieder auf ihren Sondergebieten über die neotropische Insektenfauna arbeiten. Die ausgezeichnete Schriftleitung von Th. Borgmeier hat es verstanden, die «Revista» zu einem Zentralorgan für die Kenntnis der Insekten der Neotropis auszugestalten, und erstrangige Mitarbeiter aus allen Ländern der Erde haben die Ergebnisse ihrer Forschungen niedergelegt. So sind hier im Verlaufe weniger Jahre eine grosse Anzahl grundlegender Arbeiten zur Kenntnis der Insektenwelt Südamerikas veröffentlicht worden.

Die Zeitschrift ist für jeden Entomologen, zu dessen Spezialgebiet auch Angehörige der neotropischen Fauna gehören, unentbehrlich. Sie bringt ausser wertvollen Originalarbeiten auch eine entomologische Bibliographie mit kurzen Referaten über die Neotropis behandelnde Artikel. Die stattlichen 3 Nummern, die in jedem Jahre erscheinen, werden für nur 4 USA. \$ geboten. Wenn die gegenwärtigen Verhältnisse uns deutschen Entomologen den Bezug der Zeitschrift im Augenblick leider nicht gestatten, so hoffen wir doch, in einer recht nahen Zukunft die «Revista» wieder auf dem Büchertisch unserer Entomologen eintreffen zu sehen.

Herrn Th. Borgmeier auch an dieser Stelle unsere besten Wünsche für eine weitere gedeihliche Entwicklung dieser schönen Zeitschrift!

E. M. Hering.

### A. Möller: As hortas de fungo de algumas formigas sul-americanas

O dr. A. P. Viegas, Chefe da Seção de Botânica do Instituto Agrônomo de Campinas (S. Paulo), em colaboração com o snr. E. M. Zink, Bibliotecário do mesmo Instituto, acaba de publicar a tradução portuguesa da celebre obra de Möller, aparecida em 1893 sob o título: «Die Pilzgärten einiger südamerikanischer Ameisen». Trata-se de uma obra clássica, que sempre será a base das investigações relativas aos fungos cultivados pela sauva e outras formigas cortadeiras. A tradução apareceu como «Suplemento n.º 1» da «Revista de Entomologia», com 122 páginas de texto, 4

figuras e 7 estampas. O preço é de 20\$000 rs. para o Brasil, e de \$1.50 U.S. para o estrangeiro. Os pedidos podem ser dirigidos a Thomaz Borgmeier, Convento S. Antonio, Largo da Carioca, Rio de Janeiro, Brasil.

### Notícias diversas

O Prof. Lauro Travassos (Instituto Oswaldo Cruz, Rio de Janeiro) foi eleito membro correspondente da «Zoological Society of London».

Em agosto deste ano faleceu em Resistencia (Chaco, Argentina) o entomólogo Pedro C. L. Denier, conhecido especialista da família *Meloidae* (Col.).

A «Academia Nacional de Ciencias Exactas, Físicas y Naturales» de Buenos Aires conferiu este ano o «Prêmio Dr. Eduardo L. Holmberg» ao entomólogo argentino E. E. Blanchard, pelo seu trabalho «Los Sarcofágidos argentinos, contribución a su conocimiento», publicado em *Physis*, vol. XVII, 1939.

Em Brisbane (Queensland, Australia) faleceu o dr. A. A. Girault, notavel conhecedor dos Chalcidideos. Era natural de Annapolis (Maryland, U.S.A.), onde nascera em 9 de Janeiro de 1884.

Em 1 de dezembro faleceu em S. Paulo, em consequência de uma intervenção cirúrgica, o dr. Edmundo Navarro de Andrade, o grande propagandista da plantação de Eucalyptus no nosso paiz e que se notabilizou tambem por diversos trabalhos sobre entomologia florestal. Publicaremos um necrológio mais extenso no próximo número.

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por T. BORGMEIER

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Traz duas espécies novas do Brasil.

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